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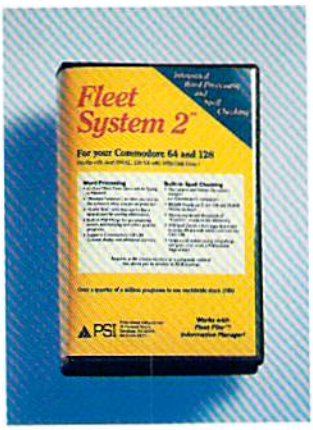

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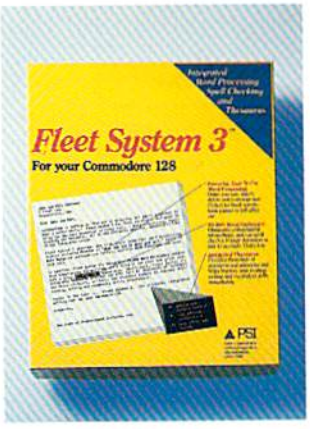

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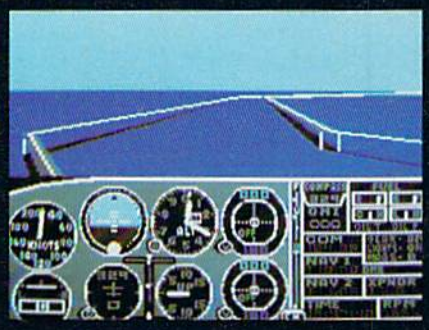

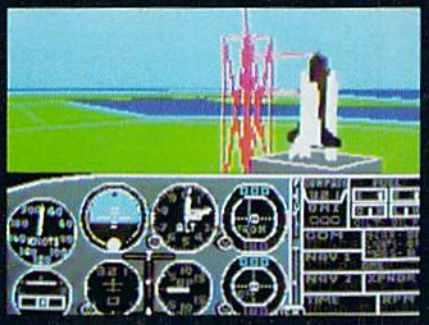

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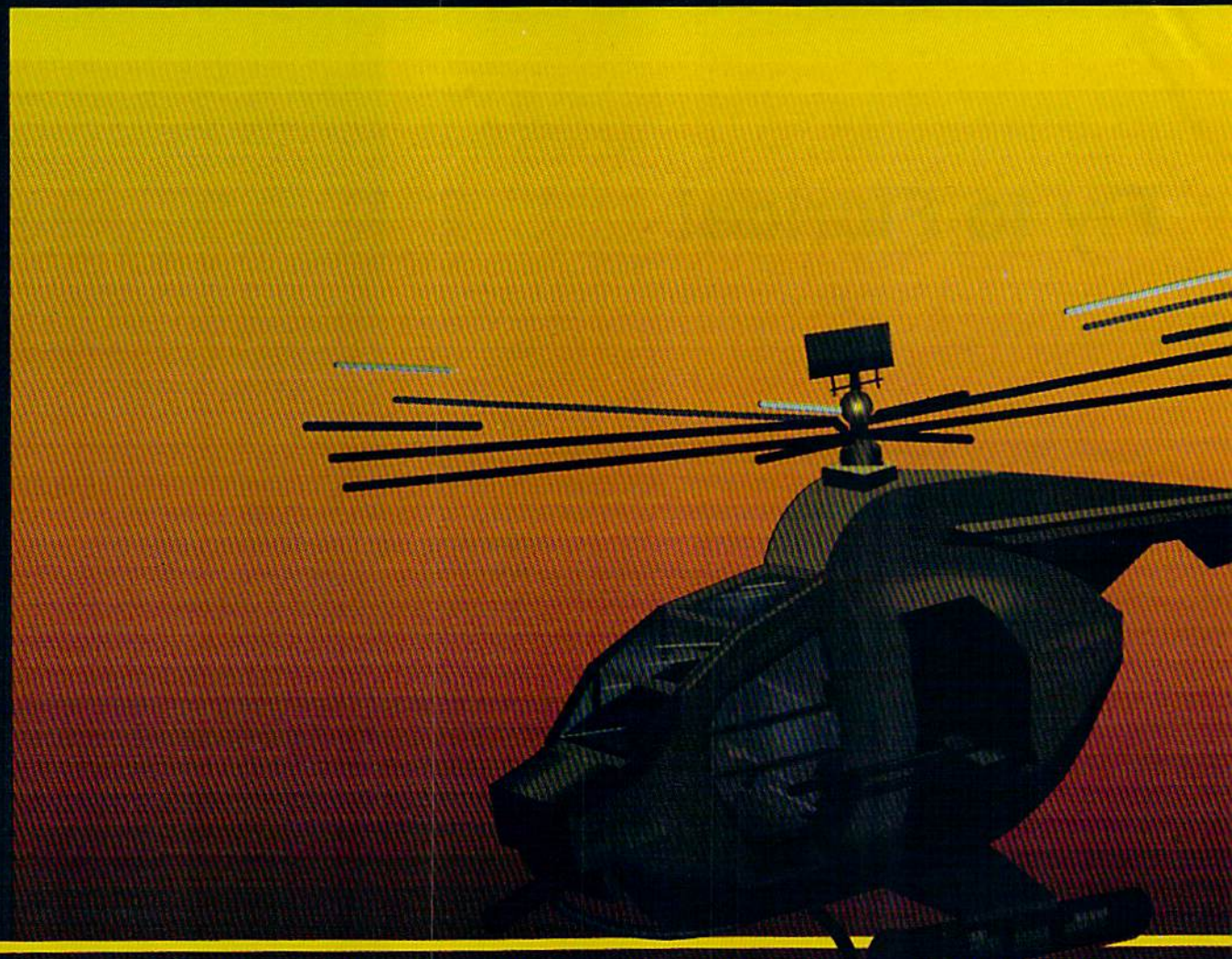

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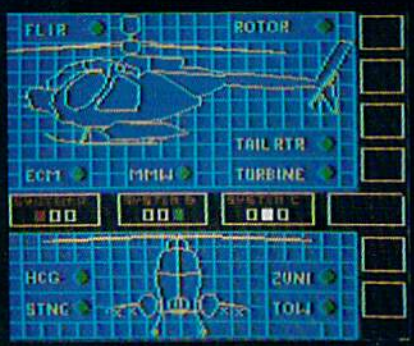

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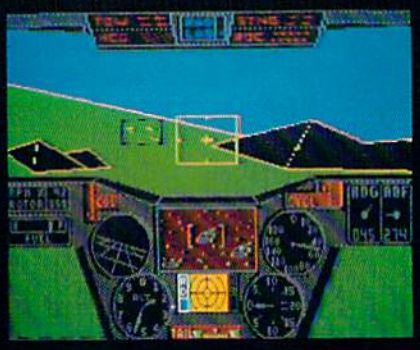

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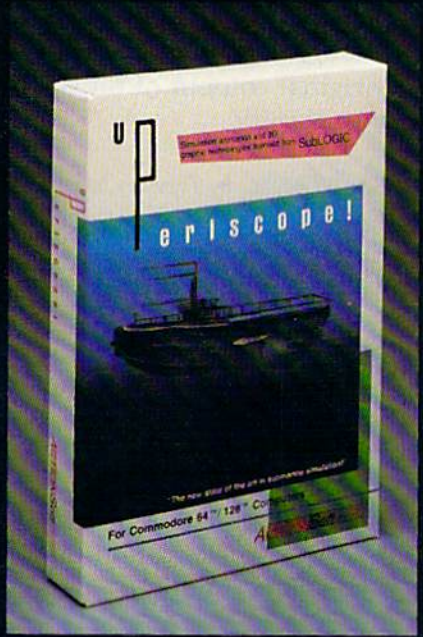

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APRIL 1987
VOLUME 4, NUMBER 4

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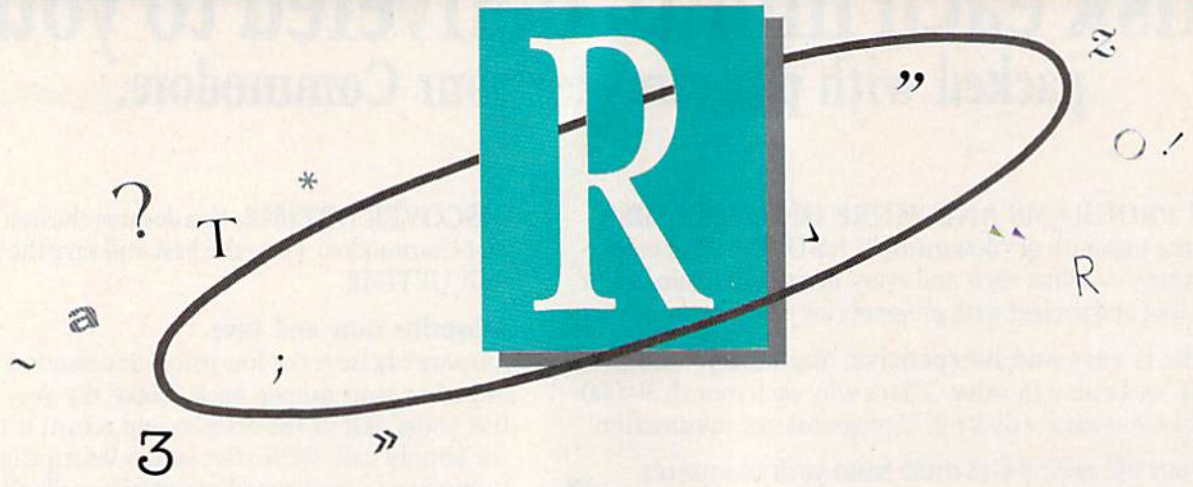

APRIL HIGHLIGHTS

Perhaps no other article in the history of *RUN* magazine has generated as much response as "The Software War," published in last January's issue.

The mail sack has been bursting at the seams this month with reader reaction to this topic. Respondents include self-proclaimed software pirates who cited expensive software and a limited budget as justification for their stealthy activities; disgruntled software developers who complained about the availability of disk copiers cutting into their sales; and some users who stated that they have traded in their Commodores to join the IBM crowd, where, they assert, copy-protected software is less prevalent than in the Commodore market.

In this issue, we have devoted our Mail RUN column to your responses. The diversity of opinions represented suggests that there are no simple solutions in sight.

RUN will continue to keep the pages of the magazine open to the examination of such reader-oriented topics.

In this month's cover story, author Jim Oldfield reports on the expanding world of hard disk drives. While this technology is not usually associated with Commodore computers, a growing number of companies are entering this market. Commodore 64 and 128 owners now have several viable hard disk units to choose from to meet their mega-memory requirements.

Specific applications, such as bulletin boards, education and small business require large amounts of memory. These are ideal candidates for a hard drive, and the selection on the market is varied.

If you're not a power user, but are looking for large amounts of storage space, then you might want to consider a hard drive unit, which offers several advantages over floppies besides capacity—namely, speed and ease of use. It also eliminates having to swap floppy disks.

Of course, a hard drive represents a substantial investment for the typical Commodore user. But, depending on your needs, the ease of use it represents may make your investment worthwhile.

When he said, "April is the cruellest month," T. S. Eliot wasn't kidding. April can be a taxing time of year for everyone. But there is help—in the form of some commercially available tax programs, which we review in this month's issue. These programs won't eliminate the drudgery of gathering and organizing the information, but using them may be preferable to doing your taxes by the traditional paper-and-pencil method.

Users of *RUN*'s Productivity Paks are, by now, familiar with the popular Datafile database management system for the C-64. This series includes a useful companion program, DFCalc, which lets you produce spreadsheet-like reports using your Datafile files.

In response to reader requests, we have made this program available in the magazine. We have devoted a good portion of the magazine to this program, but we feel that it's worth it. We know you'll find this program to be of high quality and useful in generating reports.

Creating a menu for programs can be tedious, so be sure to check out this month's Easy Applications column, which features a program entitled The Menu Machine. This program will instantly provide you with impressive menus for your programs. You can now direct your energies to writing your program instead of worrying about the time-consuming task of creating the menu.

Be sure to check out this month's Software Gallery, which contains reviews of the latest software for the 64 and 128 market. Read reviews of Activision's three new offerings from abroad. Dreamrider Software has introduced Operation Terminal, a modem game that can be played by two people over the phone line. Other, more traditional, modem games, such as checkers, chess and battleship, are also reviewed this month.

Hungry adventurers in need of a challenge will want to read the review of Strategic Simulations' Shard of Spring.

If you use an IBM PC at the office, but a Commodore at home, then you'll be interested in The Big Blue Reader, which lets your 128 read IBM PC files.

Bard's Tale is back. The Destiny Knight is Electronic Arts' sequel to their popular dungeons and dragons adventure game.

Also reviewed this month are a high-flying space battle and a C-64 spreadsheet enhancement. Find out how *RUN*'s expert reviewers graded these new releases. **db**

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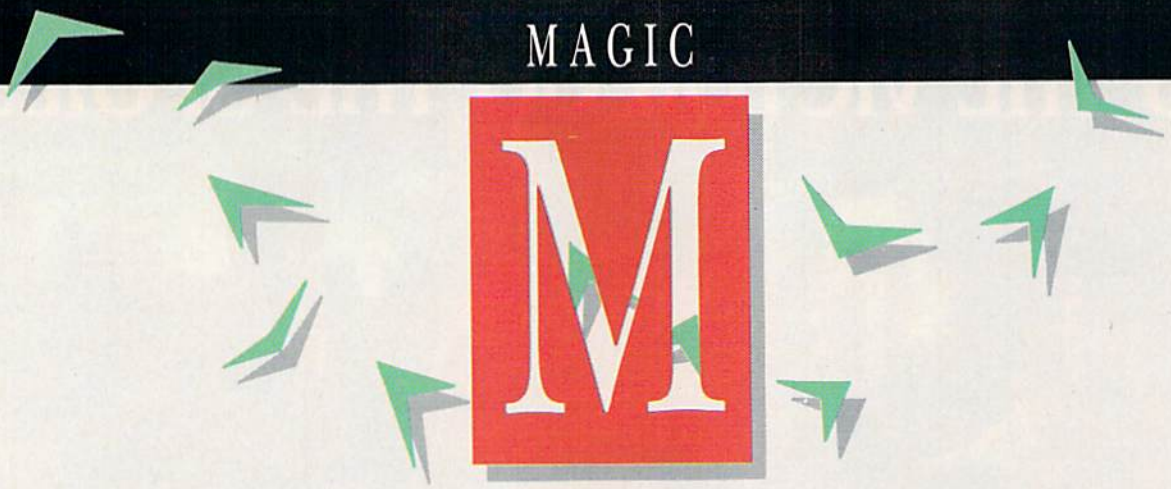

Load and run Basic programs the easy way; add a keyboard tone feature to your C-64; simplify program debugging; default to disk every time; create colorful bar charts; type from right to left on your C-64; and more.

Compiled by JIM BORDEN

Magic is the original *column of reader-submitted hints and tips. Each month we present brief, useful computer "tricks" to help you get the most out of your Commodore computing system—whether you're a beginning or advanced computerist, a C-64 or C-128 owner. Magic is a forum for* RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to:*

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RUN *pays $10 to $40 for each trick accepted for publication in the column. A payment of $50 and a Magic Contributor T-shirt is awarded for the Trick of the Month. To be eligible, the Trick of the Month must be for the C-64 or the C-64 and C-128. Tricks for the C-128 only are not eligible for Trick of the Month.*

If you'd like a copy of RUN*'s latest edition of the Magic Trick Writer's Guide, enclose a self-addressed, stamped envelope with your request, and you'll receive a copy in two to three weeks.*

$3C7 64-yard dash—I teach computer science at a small private school. Unfortunately, we do not have as many computers as we'd like, and, until now, fighting over computer time had been a real problem. The 64-Yard Dash program is my solution. (The program should also run on the VIC-20, Plus/4 and C-128.)

Type in the program and run it. You'll be asked to give the number of students and their initials (two characters). The program will randomly choose the order in which students may use the computer. Watch out for clever students who might try to alter the program in their favor (this is the voice of experience speaking).

```
10Ø PRINT"{SHFT CLR}{CTRL 2}"TAB(14)"64 YAR
    D DASH":POKE5328Ø,Ø:POKE53281,Ø
11Ø INPUT"{2 CRSR DNs}NUMBER OF PEOPLE (8 M
    AX)";N:IFN>8ORN<1THENRUN
12Ø FORA=1TON
13Ø PRINT"{HOME}{6 CRSR DNs}INITIALS OF PER
    SON #{8 SPACEs}{8 CRSR LFs}";:INPUTN$(A
    )
14Ø IFLEN(N$(A))<>2THEN13Ø
15Ø NEXT
16Ø PRINT"{SHFT CLR}{CRSR DN}"TAB(14)"64 YA
    RD DASH{3 CRSR DNs}"
17Ø PRINTSPC(38)"{COMD S}"
18Ø FORL=1TON*2:PRINTSPC(38)"{SHFT B}":NEXT
19Ø PRINTSPC(38)"{COMD X}{HOME}{5 CRSR DNs}
    "
2ØØ FORA=1TON:PRINTN$(A):PRINT:NEXT
21Ø TI$="ØØØØØØ"
22Ø R%=1+N*RND(.):PRINT"{HOME}{3 CRSR DNs}"
    :FORK=1TOR%:PRINT"{CRSR DN}":NEXT:P(R%)
    =P(R%)+1
23Ø IFP(R%)>34THEN22Ø
24Ø PRINTSPC(P(R%)+2)"{CTRL 9}{CTRL 2} {CRS
    R DN}{CRSR LF}{CTRL 6} {CRSR UP}{CTRL 9
    }{CTRL 2} {CRSR DN}{CRSR LF}{CTRL 6}{CT
    RL Ø}{SHFT LB.}"
25Ø IFP(R%)=34THEN27Ø
26Ø GOTO22Ø
27Ø W=W+1:T$=MID$(STR$(INT((TI/6Ø)*1ØØ)/1ØØ
    ),2)
28Ø PRINTSPC(25)"{CTRL 9}{CTRL 2}{2 CRSR UP
    s}"T$TAB(3Ø)"SEC"TAB(34)"["MID$(STR$(W)
    ,2)"]":IFW<NTHEN22Ø
29Ø PRINT"{HOME}{23 CRSR DNs}"TAB(13)"{CTRL
     2}PRESS ANY KEY."
3ØØ GETA$:IFA$=""THEN3ØØ
```

Scott M. Huse
Salisbury Center, NY

$3C8 Easy-access dip switches—When I use my Card?+G interface with my software, I frequently need to change the positions of interface switches 7 and 8 on the circuit board, and the board has to be removed each time to make the change.

I solved this annoying problem by soldering flexible wires to these switches on the bottom of the circuit board and bringing them out to miniature single-pole, single-throw (SPST) switches mounted in a small box outside the

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interface. I also mounted another SPST switch to control power from the cassette port to the interface.

Now, when I load a program and find that one or both switches need to be changed, I just change the SPST switches. Be *sure* you turn the SPST power switch off before flipping the other switches, and then turn it on again afterwards.

F. C. Horn
Jekyll Island, GA

$3C9 Easy load and run—I've found a quick and easy way to load and run a Basic program on any Commodore computer:

LOAD "filename",8:{SHFT RUN-STOP}

When you press the shift/run-stop combination, which stores the Return and Run commands in the buffer, your program will load and run automatically.

If you want to load programs from the directory with my trick, type LOAD over the number of blocks and move the cursor past the second quote. Then type ,8: and press the shift/run-stop key. If the directory is on the screen, you can load a program with this procedure only if the program begins with a line 0. Otherwise, the program will crash.

Carlos Villalpando
Weslaco, TX

$3CA C-64 keyboard tone—Some computers have a built-in keyboard tone feature that emits a clicking sound to confirm that a key was pressed. My program adds this feature to your C-64. To disable the keyboard tone, press the run-stop/restore combination; to re-enable it, type SYS679.

```
1 REM C-64 KEYBOARD TONE-RICHARD PENN
1Ø FOR U=679TO755:READQ:POKEU,Q:CK=CK+Q:NEX
   T
11 IF CK<>9477THEN PRINT"ERROR IN DATA":END
12 SYS679
13 DATA 12Ø,169,18Ø,141,2Ø,3,169
14 DATA 2,141,21,3,88,96,166
15 DATA 197,228,2,24Ø,55,134,2
16 DATA 224,64,24Ø,49,169,15,141
17 DATA 24,212,169,Ø,141,5,212
18 DATA 169,24Ø,141,6,212,169,3Ø
19 DATA 141,1,212,169,Ø,141,Ø
2Ø DATA 212,169,17,141,4,212,16Ø
21 DATA Ø,162,Ø,232,224,255,2Ø8
22 DATA 251,2ØØ,192,12,2Ø8,244,169
23 DATA 16,141,4,212,76,49,234
```

Richard Penn
Montreal, Quebec, Canada

$3CB Disk mode changer—I write and edit C-64 Basic programs on the C-128 in 128 mode, but the 1571 disk drive can cause delays when it first tries to read the directory off some 1541-formatted disks. To operate in 1541 mode without the delays, type in my program. Use the F4 key to switch to 1541 mode and the F8 key to switch to 1571 mode. Press F1 to use the 40-column screen in Slow mode.

```
1 REM 1571/1541 MODE SELECT-L.L.PANKEY
1Ø KEY4,"OPEN1,8,15,"+CHR$(34)+"UØ>MØ"+CHR$
   (34)+":CLOSE1:FAST"+CHR$(13)
2Ø KEY8,"OPEN1,8,15,"+CHR$(34)+"UØ>M1"+CHR$
   (34)+":CLOSE1:FAST"+CHR$(13)
3Ø KEY1,"SLOW"+CHR$(13)
```

L. L. Pankey
Dana Point, CA

$3CC C-128 debugging aid—I enjoy debugging programs, but clearing the screen, listing the offending line and then moving the cursor to make the correction is nothing but drudgery. Adding a few lines to my programs has restored the good times.

Line 10 traps the error and directs control to line 63000, which clears the screen below the cursor and prints the error message. Then line 63010 positions the cursor at the beginning of the offending line, with the error underscored (80-Column mode) or in reverse (40-Column mode). The only thing left for me to do is move the cursor to the error and correct it!

```
1 REM 128 DEBUG AID-EDWARD HORGAN
1Ø TRAP 63ØØØ
2Ø THIS IS AN INTENTIONAL ERROR
3Ø END
63ØØØ PRINT CHR$(27)"@"ERR$(ER)
63Ø1Ø HELP:PRINT"{4 CRSR UPs}":END
```

Edward Horgan
Coatesville, PA

$3CD Plus/4 Perfect Typist—Many of the programs in *RUN* can be easily adapted for the Plus/4, but you need a checksum program to verify the program lines as they are entered. Making a few changes to the 128 Perfect Typist program provides the checksums for the Plus/4.

Enter the 128 Perfect Typist program listed in the How To Type in Listings department of this magazine, then make the following changes before saving the program:

Line 1: change the line to 1 REM PLUS/4 PERFECT TYPIST
Line 20: change 28312 to 28306
Line 40: change 128 to +4
Line 5260: change 022 to 020 and 023 to 021
Line 5280: change 116 to 115
Line 5290: change 117 to 116

Now save the program as +4 Perfect Typist.

Since the memory locations for Basic program storage overwrite the machine language, you must type the following line in Direct mode before loading +4 Perfect Typist:

POKE 44,22:POKE 5632,0:NEW {RETURN}

This line moves the bottom of Basic upward to protect the machine language.

Now you're ready to load and run +4 Perfect Typist. Remember, when you type in C-128 listings, a C-128 keyword that's foreign to the Plus/4's Basic language will produce an incorrect checksum, so the keyword will have to be changed to work on the Plus/4.

Frank Hiltibrand
Newport, KY

Continued on p. 84.

(Top Guns don't always fly on air . . . Some fly on water)

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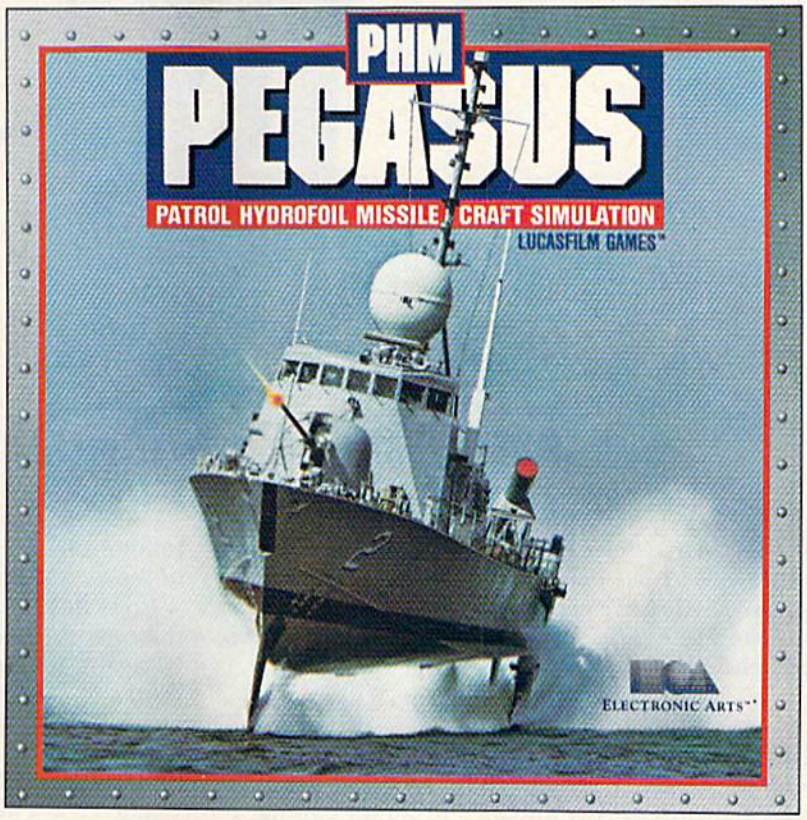

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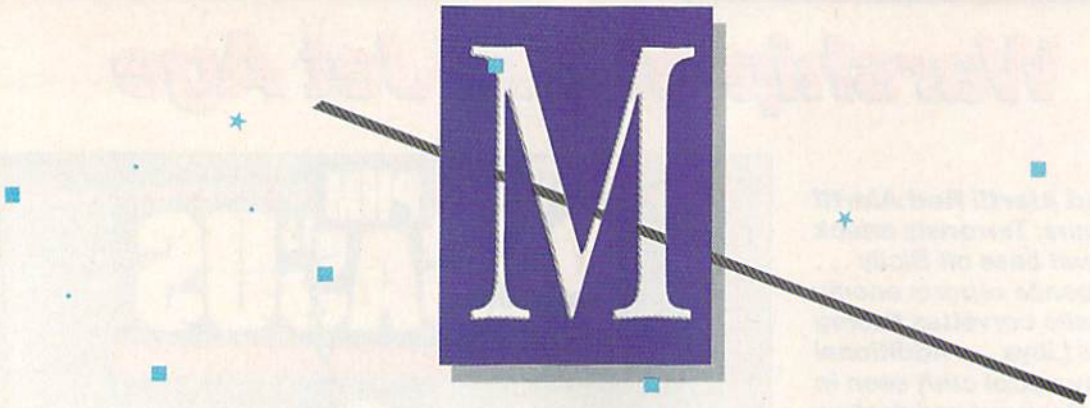

EASY-TO-USE SUBROUTINES AND UTILITIES

Mega-Magic, an extension of the RUN *Magic column, offers, each month, a short but interesting and useful subroutine or utility program. Although noticeably longer than those in the Magic column, these listings are still short enough to type in easily and quickly.*

C-64 Edit Enhancer—With this utility, you can have a Quote mode toggle, a screen dump key and a screen-freeze key that will greatly enhance program editing.

The Quote Mode Toggle

This part of the Edit Enhancer program lets you toggle Quote mode on to create reversed characters, and then off when you want to move the cursor around the screen without creating reverse characters. With a Quote mode toggle key, you can easily turn Quote mode on and off at will to help simplify editing program lines containing reverse characters.

When you're using the Quote mode toggle switch (F7), you'll know Quote mode is active by the red border on the screen; the border changes to its default color, light blue, when you deactivate Quote mode. You can select other colors by adding the following lines to the program. To change the border's default color (Quote mode off), add 225 POKE BB + 49,{color code #}. To change the border's red color (Quote mode on), add 226 POKE BB + 57,{color code #}.

To demonstrate the Quote mode toggle's usefulness, type in the listing, save it and run it. Then type in the following line: 10 PRINT"CDTHIS IS A TESTR" and press return. Now try replacing the C, D and R characters with reverse characters. A pain, isn't it? Next, position the cursor over the C, and press F7 to turn Quote mode on (notice the border-color change). Then press the shifted-clear key, followed by the cursor-down key. The reverse characters of the keys should replace the C and D.

Press the F7 key again to turn Quote mode off, and use the cursor-right key to move the cursor to the final R. Press F7 again, followed by the cursor-right key. Finally, press return to enter the line. Need I say more about the advantages of the Quote mode toggle?

The Screen Dump

The F8 key activates the screen dump and can be used with most printers—graphic or nongraphic. You can use it any time you want to dump a screen to the printer.

When you run the program, it will ask if your printer is ready. Turn on your printer and answer Y. (An N answer implies that you don't have a printer and will disable the screen dump feature.) The program will then ask if your printer supports graphics characters. Answer Y if your printer (and interface) can emulate the Commodore graphics characters; otherwise enter N. If your printer cannot produce graphics characters, a space is substituted for every graphics character the program encounters.

The Screen-Freeze

If you want to print a frozen screen, first pause the screen momentarily with the shift key (or indefinitely with the shift-lock key). Then press F8 to print the screen. When the shift key is released, the program will continue where it left off.

The machine language program is poked in starting at location 52900, but, if necessary, you can poke it into any available 347-byte memory space by changing the value of BB in line 30 to the new starting address. R

Timothy M. Maloney
Knoxville, TN

RUN It Right

C-64; printer

Listing 1. *C-64 Edit Enhancer program.*

```
1Ø REM C64 EDIT ENHANCER-TIMOTHY
   M. MALONEY              :REM*48
2Ø DEFFNHI(X)=INT(X/256):DEFFNLO
   (X)=X-256*INT(X/256)    :REM*72
3Ø BB=529ØØ:A=BB:A9=Ø:NP=Ø
                           :REM*228
4Ø PRINT "{SHFT CLR}{2 CRSR DNs}
   *** EDIT ENHANCER ***": PRINT
   "{2 CRSR DNs}{4 SPACEs}BY TIM
    MALONEY"               :REM*152
5Ø PRINT "{2 CRSR DNs}F7--QUOTE
   MODE TOGGLE"            :REM*152
6Ø PRINT "F8--CHARACTER SCREEN D
   UMP"                    :REM*15Ø
7Ø PRINT"{3 CRSR DNs}IS PRINTER
   READY? (Y/N) ";         :REM*16Ø
8Ø GET A$:IF A$<>"Y"ANDA$<>"N" T
   HEN8Ø                   :REM*12Ø
9Ø PRINTA$:PRINT:IF A$="N" THEN
   NP=1:GOTO13Ø            :REM*13Ø
1ØØ PRINT"{CRSR DN}DOES YOUR PRI
    NTER" : PRINT"SUPPORT GRAPHI
    C CHARACTERS (Y/N) ? ";
                           :REM*58
11Ø GET A$:IF A$<>"Y"ANDA$<>"N"T
    HEN11Ø                 :REM*116
12Ø PRINT A$:IF A$="Y" THEN A9=1
                           :REM*23Ø
13Ø PRINT:PRINT "{2 CRSR DNs}STO
    RING ML CODE STARTING AT";BB
    ;"..."                 :REM*4
14Ø READ N:IF N=-9999 THEN 17Ø
                           :REM*14Ø
15Ø CS=CS+ABS(N):IF N>=Ø THEN PO
    KEA,N:A=A+1:GOTO14Ø    :REM*174
16Ø N=BB+ABS(N):POKEA,FNLO(N):PO
    KEA+1,FNHI(N):A=A+2:GOTO14Ø
                           :REM*78
17Ø IF CS<>456Ø8 THEN PRINT"ERRO
    R IN DATA STATEMEMTS":END
                           :REM*184
18Ø POKE BB+2,FNLO(BB+36):POKEBB
    +7,FNHI(BB+36)         :REM*1ØØ
19Ø POKE BB+12,FNLO(BB+336):POKE
    BB+17,FNHI(BB+336)     :REM*72
2ØØ IF NP THEN POKEBB+9Ø,234:POK
    EBB+91,234:POKEBB+92,234
                           :REM*14Ø
21Ø IF A9=1 THEN25Ø        :REM*112
22Ø POKE BB+2Ø6,234:POKE BB+2Ø7,
    234: POKE BB+2Ø8,234 :REM*92
23Ø POKE BB+263,234: POKE BB+264
    ,234: POKE BB+265,234
                           :REM*1Ø6
24Ø POKE BB+241,169: POKE BB+242
    ,32                    :REM*246
25Ø PRINT "{3 CRSR DNs}F7 & F8 K
    EYS ACTIVATED...": PRINT "{C
    RSR DN}SYS";BB+23;" TO DEACT
    IVATE."                :REM*234
26Ø PRINT "SYS";BB;" TO RE-ACTIV
    ATE.":SYS BB:NEW:END:REM*151
27Ø DATA 12Ø,169,2Ø5,141,2Ø,3,16
    9,158,141,21,3,169,247,141,3
    8,3,169,159,141,39   :REM*117
28Ø DATA 3,88,96,12Ø,169,49,141,
    2Ø,3,169,234,141,21,3,88,96,
    165,2Ø3,2Ø5,-334       :REM*83
29Ø DATA 24Ø,35,141,-334,138,72,
    162,14,165,212,5,216,24Ø,2,1
    62,2,142,32,2Ø8,1Ø4    :REM*29
3ØØ DATA 17Ø,173,-334,2Ø1,3,24Ø,
    11,165,2Ø6,141,-335,173,-334
    ,76,49,234,138,72      :REM*55
31Ø DATA 152,72,173,141,2,24Ø,6,
    32,-146,76,-136,165,216,2Ø8,
    11,165,212,73,1,24Ø    :REM*91
32Ø DATA 5,133,212,76,-136,164,2
    11,136,173,-335,145,2Ø9,169,
    157,141,119,2,169,1    :REM*177
33Ø DATA 133,198,169,Ø,133,212,1
    33,199,133,216,1Ø4,168,1Ø4,1
    7Ø,173,-334,76,49      :REM*3
34Ø DATA 234,169,125,162,4,16Ø,2
    55,32,186,255,169,Ø,32,189,2
    55,32,192,255,162      :REM*77
35Ø DATA 125,32,2Ø1,255,162,Ø,14
    2,-346,134,251,162,4,134,252
    ,32,-323,169,17,172    :REM*217
36Ø DATA 24,2Ø8,192,21,2Ø8,2,169
    ,145,32,2Ø2,241,16Ø,Ø,177,25
    1,72,1Ø,144,7,169      :REM*37
37Ø DATA 18,32,2Ø2,241,23Ø,199,1
    Ø4,72,1Ø,1Ø,1Ø4,8,41,63,2Ø1,
    32,176,2,9,64,4Ø       :REM*197
38Ø DATA 144,2,9,128,172,24,2Ø8,
    192,21,2Ø8,6,2Ø1,95,48,2,234
    ,234,2Ø1,34,2Ø8,7      :REM*195
39Ø DATA 169,39,32,2Ø2,241,169,3
    9,32,2Ø2,241,165,199,24Ø,9,1
    69,146,32,2Ø2,241      :REM*47
4ØØ DATA 169,Ø,133,199,174,-346,
    232,224,4Ø,2Ø8,1Ø,169,13,32,
    2Ø2,241,32,-323,162    :REM*17
41Ø DATA Ø,142,-346,23Ø,251,2Ø8,
    2,23Ø,252,166,251,224,232,2Ø
    8,149,166,252,224      :REM*29
42Ø DATA 7,2Ø8,143,169,13,32,2Ø2
    ,241,32,2Ø4,255,169,4,32,195
    ,255,96,162,1Ø,169     :REM*111
43Ø DATA 32,32,2Ø2,241,2Ø2,2Ø8,2
    48,96,234,234,72,173,141,2,2
    Ø8,251,1Ø4,76,2Ø2      :REM*147
44Ø DATA 241,-9999         :REM*191
```

■

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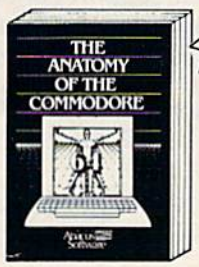

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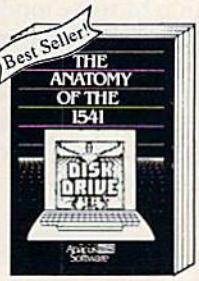

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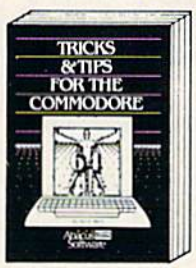

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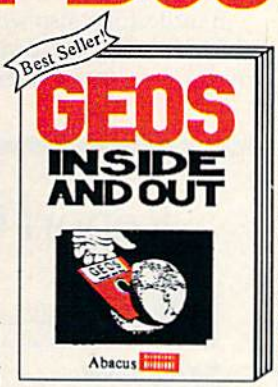

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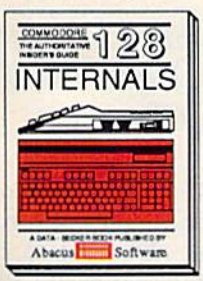

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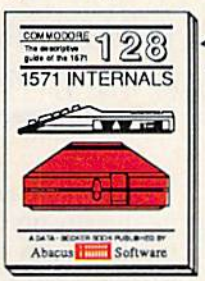

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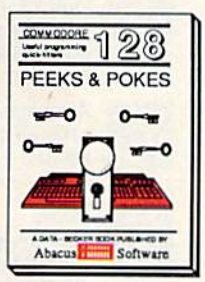

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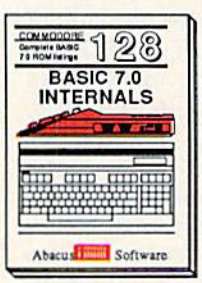

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B+

Play Games With Friends Near and Far

It's always been possible to play telecomputing, or modem, games directly between two machines, without incurring the expense of a network service. What has been missing is readily available software with which to do it.

However, Bear Graphics has introduced some packages that cover three popular games—checkers, chess and battleship. As far as the software is concerned, you have everything you need to begin telecomputing immediately with a friend. All three programs, which are sold separately, come with two disks and two instruction sheets—now that's what I call user-oriented!

I did find one shortcoming with the instructions: No mention is made of the type of modem required. It appears designed for use mainly with manual modems such as the 1600, 1650 and their newer counterparts. Also, there is no provision for autodialing or other enhanced features.

Trapdoor Checkers is a slight variation on a traditional checkers game. Each player selects the position of several booby-traps that will swallow any playing piece that lands on them. A communications line appears at the bottom of the screen to let you send and receive messages during the game.

Trapdoor Checkers and Radical Chess both work on either a C-64 or C-128 in 64 mode. I had no problem using the programs on several combinations of computers, disk drives and modems.

Radical Chess is a traditional chess game and the board is appealing to the eye. A set of cross-hairs is shifted across the screen to the piece you want to move. You press return and move the cross-hairs to the new position. Pressing return again drops the piece there if it is a legal move; if not, the move is ignored.

Baudleships also works on either a C-64 or a C-128. However, when running on a 128, it does default to 40-column mode. If you forget, there's a helpful reminder on the 80-column screen.

Interestingly, there is no autoboot sector on the disk for either mode—that's a minor oversight that is easy to correct.

Baudleships, the battleship-like game, is played on a traditional grid that lets you set your pieces just as you would on a board game. Sound is used effectively along with text to indicate things like bad moves.

Bear Graphics has done an excellent job in considering the needs of the user, and they have priced their software attractively. With the addition of some modem support options from within the program and an appropriate update of the instructions, all the packages would be top-notch. *(Bear Graphics Software, PO Box 12206, New Brighton, MN 55112. C-64/$24.95 each, disk.)*

Jim Grubbs
Springfield, IL

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Average.*** Lives up to its billing. No major hassles, headaches or disappointments here.

D ***Poor.*** This program has some problems. There are better on the market.

E ***Failure.*** Many problems; should be deep-sixed!

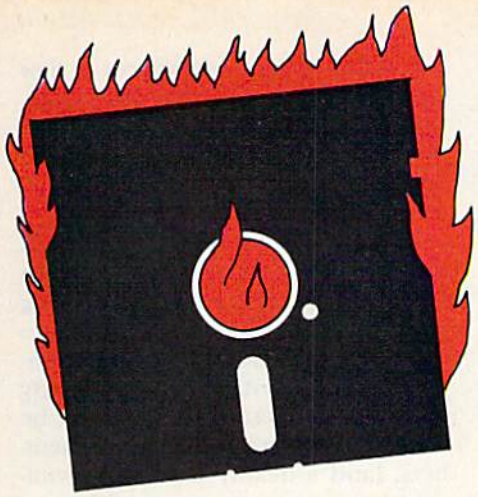
The Big Blue Reader

A

With This Program, Bringing Work Home Is No Longer a Chore

The Big Blue Reader is very likely unique: In any case, it's the only product I've seen that ably bridges the gap between Commodore and IBM computers.

With Big Blue, you can transfer ASCII files written with MS-DOS



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Circle 8 on Reader Service card.

computers into a Commodore-compatible sequential file, or transfer Commodore sequential files to MS-DOS. This isn't a program emulator that lets you run the IBM programs on your Commodore. It is, however, a tool that allows you to spend more time at home instead of at the office.

The Big Blue Reader actually turns the 1571 into a double-sided IBM disk drive. It is able to format disks in MS-DOS or make entire backups of MS-DOS disks in about four minutes. The program works best with two 1571s.

Michael Miller, the author of Big Blue, studied the capabilities of the 1571 disk drive, including its ability to read other disk formats. This feature was incorporated into the 1571 to allow the use of CP/M programs on the C-128.

Coincidentally, CP/M has the same recording technique as MS-DOS, called MFM, which technically makes it possible to program the disk drive to read disks written on IBM PCs and compatibles. Miller succeeded in converting MS-DOS, which is in a completely different logical format, into a form that's readable by the Commodore operating system.

Consider this situation: You're at your office, in the middle of a word processing project, using an IBM PC. With The Big Blue Reader, you can take your document files home, transfer them into sequential files using your C-128 and 1571, and continue working on your project, using your own word processor and surrounded by the comforts of home. You can transfer the files back to your MS-DOS disk for continuation the next day at work.

I tested The Big Blue Reader using MicroPro's word processor, WordStar. I found that Big Blue is most useful when transferring word processing files. It's slightly more difficult to transfer applications such as databases and spreadsheets.

Although the software is intended to transfer pure ASCII files, it is possible to transfer IBM Basic program files into the Commodore computer. What you end up with is a sequential file that must be tokenized, turning words such as Print and Goto into the two-byte tokens readable as program statements by the C-128's Basic interpreter. This involves a short program that prints the sequential file on the screen, then uses the keyboard buffer to force carriage returns to turn the lines of text into a program.

Going back is simpler because it only involves listing your program to a sequential file. The Big Blue Reader will make the transfer into a standard ASCII file readable by IBM Basic.

It's a rare occurrence in the software industry to find such an effective program among all the imitations. If you ever consider buying an IBM compatible and you want to retain your old C-128 documents, you must add this program to your software library. *(S.O.G.W.A.P. Software, Inc., 611 Boccaccio Ave., Venice, CA 90291. C-128/$29.95 disk.)*

Mike Konshak
Colorado Springs, CO

The Bard's Tale II: The Destiny Knight

In Search of Good, Evil and The Destiny Wand

Just when you thought it was safe to venture back into the dungeon, Electronic Arts released The Bard's Tale II: The Destiny Knight. Like the original Bard's Tale, Destiny Knight combines the best elements of traditional Dungeons and Dragons role-playing games, while adding several exciting new features.

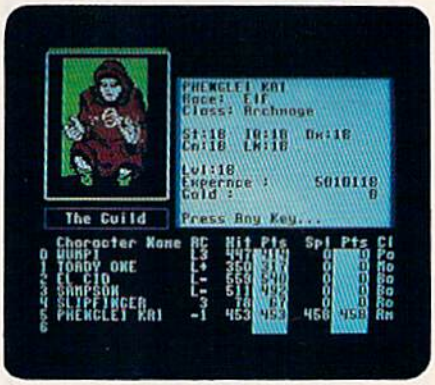
These include a starter dungeon where characters can quickly gain experience points, and "Snare of Death" puzzle rooms that must be solved within a set time limit if your band of adventurers is to get out alive. There is also a bank in the Realm's capital city of Tangramayne (with branches in other cities) where adventurers can stash their hard-earned gold for safe-keeping, as well as casinos in every city where they can lose it playing blackjack.

If you've played The Bard's Tale: Tales of the Unknown, you'll feel at home with the sequel because many aspects of game-play are identical. Your party still consists of humans, dwarfs, half-elves and the like, and all the familiar classes such as warrior and conjurer are again available.

Destiny Knight introduces a new class of magic user, the Archmage, that can only be attained through the mastery of at least three levels of spells from the other four classes of magic users.

In all, there are close to 80 spells that can be used for everything from creating floating torches for lighting your way through a dark dungeon, to summoning illusionary dragons, ninjas or storm giants to join your party and fight for you. Magic can also be used to resurrect deceased party members, land a deadly cone of gravitational energy on a group of foes or make dungeon walls vanish.

While Destiny Knight's combat system is similar to that of Tales of the Unknown, enemies now appear within a range of ten to 90 feet, and only those within "melee range" can be attacked with hand-held weapons like daggers and broadswords. Distant enemies can be battled by throwing spears or axes, or by shooting arrows.



Search the Realm in Bard's Tale II: The Destiny Knight.

Also available to aid your band of adventurers are the seven magical songs that can only be sung by bards. With names like The Archer's Tune, The Watchwood Melody and Melee March, these tunes are useful for increasing the party's capabilities during combat, or protecting them from traps while they're wandering through the Realm.

The purpose of all of this wandering, fighting, singing and spell-casting is to locate seven scattered fragments of the Destiny Wand and reforge this magical scepter. Only by doing this and vanquishing the evil Archmage Lagoth Zanta can you rid the streets of lawless mercenaries and save the Realm. Be prepared to do a lot of searching, however, because

Continued on p. 24.

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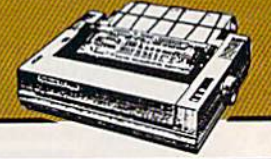

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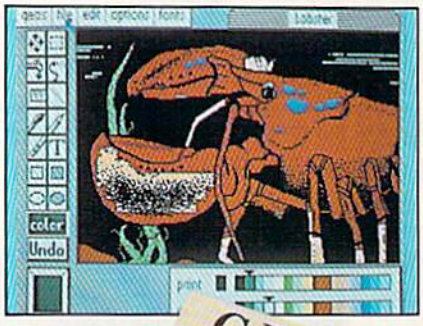

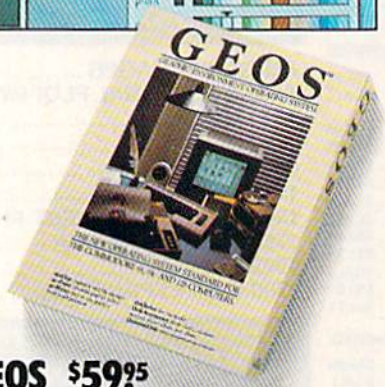

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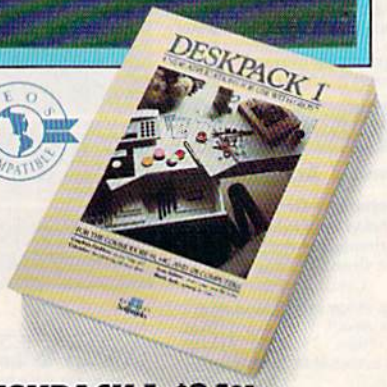

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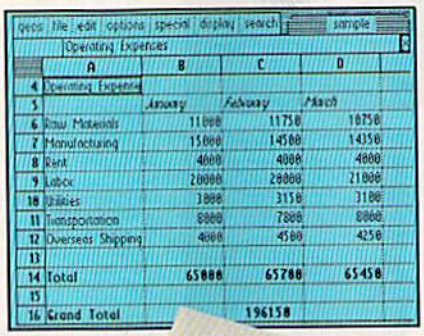

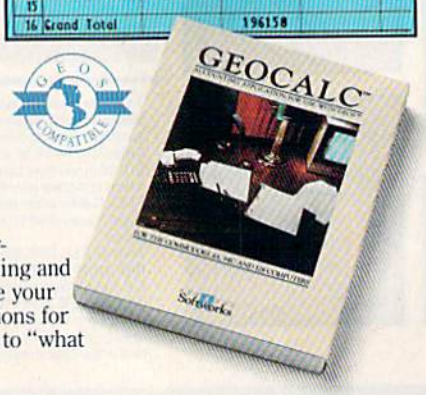

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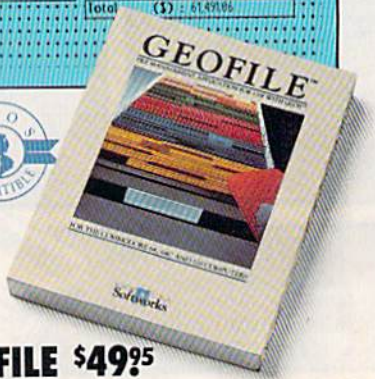

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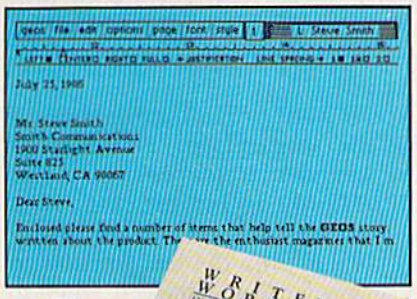

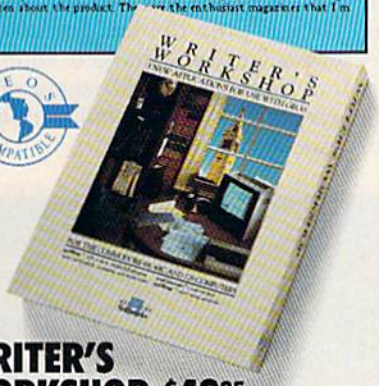

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Software Gallery

From p. 18.

the Realm includes six cities the size of the original Bard's Tale's Skara Brae as well as 25 dungeon levels.

What's more, much of the action takes place in the vast wilderness separating the cities. With all this new territory comes a host of new monsters to slay, and if you liked the colorful animation of Skara Brae's evil-doers, you won't be disappointed with the new group.

Whether you've already completed the original Bard's Tale and defeated the evil Mangar, or are still battling your way through Skara Brae, Destiny Knight greatly expands the magical world of The Bard's Tale and offers an irresistible challenge to all fans of role-playing fantasies. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95 disk.)*

Bob Guerra
Charlestown, MA

Mercenary

A

Space Is the Place, So Get Ready To Do Futuristic Battle

The premise underlying Mercenary is bound up in its subtitle, Escape from Targ. You are an intergalactic brigand for hire, and your ship has crash-landed on that planet. You find yourself allied with the native Palyars against the invading Mechanoids. The profit you make from aiding the Palyars will allow you to purchase a new interstellar vehicle.

An interesting aspect of this vector graphics game is that it requires both a joystick and keyboard commands to play. Shipboard or on-foot movement is via the joystick, while the keyboard is used to take and drop objects, board or leave your craft, operate the elevator, set your vehicle's speed, save and load games, and even quit desperate situations. The problem with quitting is that all the objects you collected will be scattered.

Included in the program is a set of maps used to navigate through Targ. Prior to marking up the maps, you should make a number of photocopies so you'll have clean copies when playing subsequent adventures. The manual lists several bits of crucial information, some subtle hints and a set of rhyming clues—all of which you need to move about and stay alive.

Datasoft also offers a tip sheet that outlines the quickest escape route. Frustrated gamers might wish to avail themselves of this sheet, but be aware that it's merely the fastest way off the planet and doesn't cover every aspect of play.

Time is not a factor in this game, which is good because you can spend days exploring this alien world. When you finally manage to lift off from Targ, you'll want to save the game to disk, as it will serve as a starting point for your next adventure in the supplemental disk, The Second City. *(Datasoft, 19808 Nordhoff Place, Chatsworth, CA 91311. C-64/$29.95 disk.)*

Bob Sodaro
Fairfield, CT

Operation Terminal

B

Fulfill Your Fantasy Of Becoming the Dashing, Daring 007

The scenario is a familiar one: You don your best James Bond demeanor as you set off for adventure. Only the most difficult missions are tough enough for you.

In order to save the world from the fate of a scientific experiment gone wrong, you must parachute onto a small island, where you will penetrate a complex and locate the formula for the antimatter substance before the bad guys get to it. You'll be working against time and a ruthless enemy.

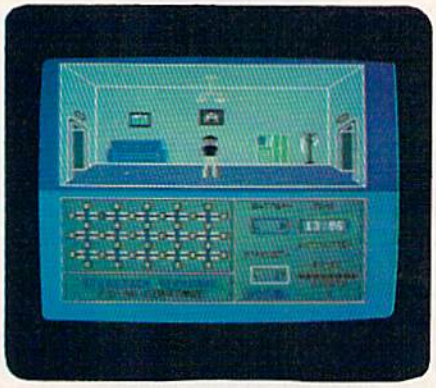
This is Operation Terminal, a modem game with a difference. It can be played by two people connected over a standard phone line, but it doesn't require hook-up to a host system, and the graphics are superior to those found on most network games.

I will tell you that I encountered several problems in reviewing this program. The first disk refused to load properly on several combinations of equipment: I tried a C-64 and C-128 in conjunction with several 1541 and 1571 disk drives, and nothing worked.

A call to customer support resulted in a sympathetic ear and the prompt delivery of a replacement copy. The new copy would not load on my C-128 with two 1571 disk drives, but it did work fine on my C-64 with a 1541. The program does employ copy protection, which might have been the cause of the problem.

With a good copy loaded, the fun begins. An optional opening sequence shows you sky-diving into your target area, but you can bypass this feature for quicker access to the game.

You'll want to familiarize yourself with the single-player Training option. A modem is not required at this point. It's you against the clock, finding your way around the antimatter complex, getting the feel for how to keep your batteries charged, when to use bombs, how to find first-aid when you need it and other details required for a successful mission.



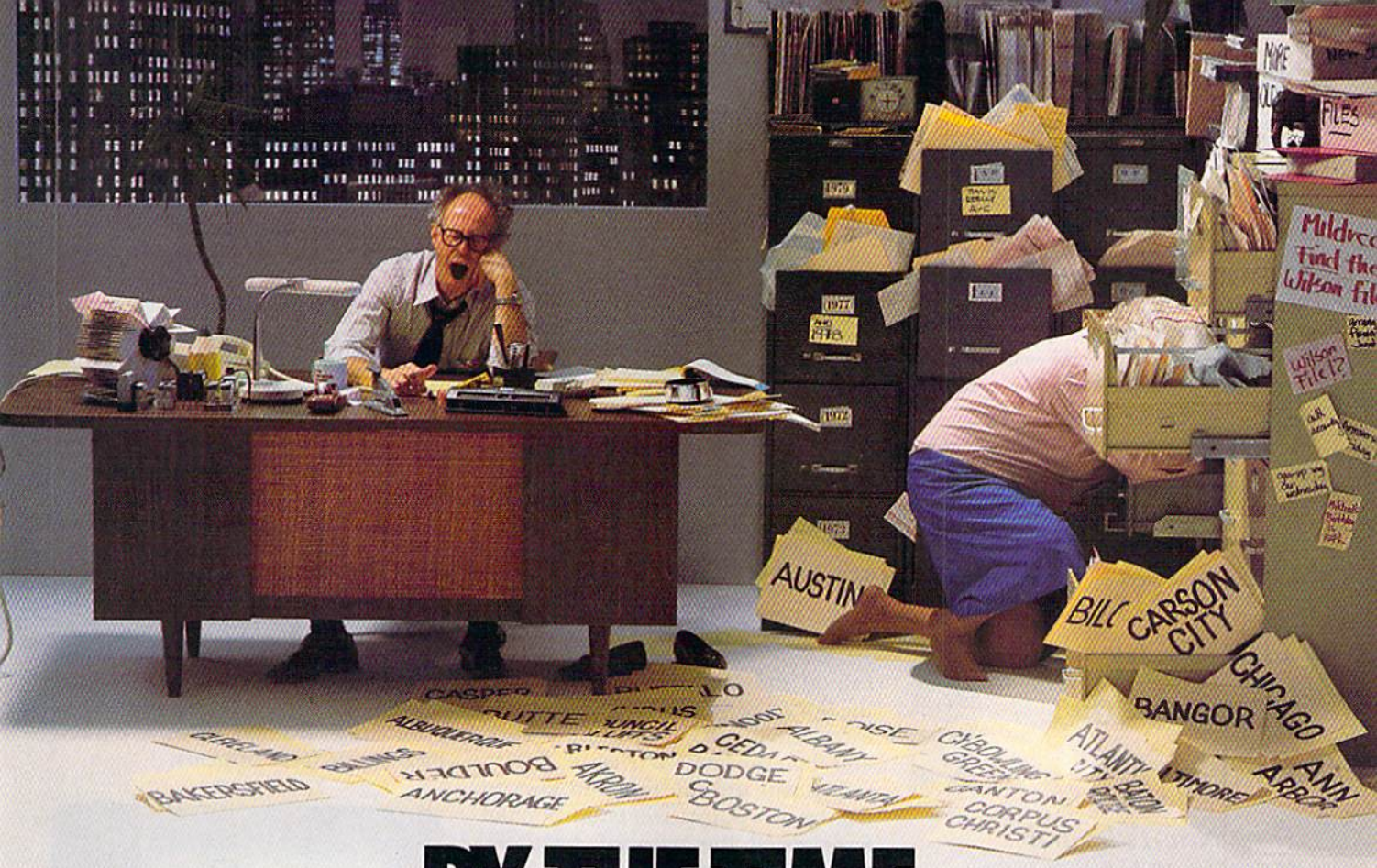
Beat the clock and your enemy in Operation Terminal.

The Training mode gives you 15 minutes to collect the needed antimatter samples and the formula and get off the island. In a two-player game, you are allocated 30 minutes.

Operation Terminal supports a wide variety of modems and is likely to be compatible with just about anything you use. Both tone and pulse dialing are supported. There's even a Communications mode that lets you chat with your friend during play.

One of the unique features of the modem version is the ability to wave at your opponent. Your character will actually wave his hand on the other screen! There's also a Radar mode for you to check to see what your opponent is up to.

As mentioned before, the graphics are good, but fall short of being visually exciting. The game itself is



BY THE TIME SHE GETS TO "PHOENIX," HE'LL BE SLEEPING.

Having thousands of facts is one thing. Finding the ones you need is another. Which is why you should consider buying geoFile. The easy-to-use database manager for GEOS-equipped Commodores.

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fairly simple and only moderately challenging.

If you are looking for something to do on a cold winter's night when you can't have friends over, Operation Terminal is an excellent form of entertainment. I hope Dreamrider will continue the effort and perhaps offer additional packages. *(Dreamrider Software, Inc., 970 N. Main St., Crete, IL 60417. C-64/$39.95 disk.)*

Jim Grubbs
Springfield, IL

Spindizzy; The Rocky Horror Show; Zoids

B+ B C

Three New Titles and One New Label Add Up to Software Fun!

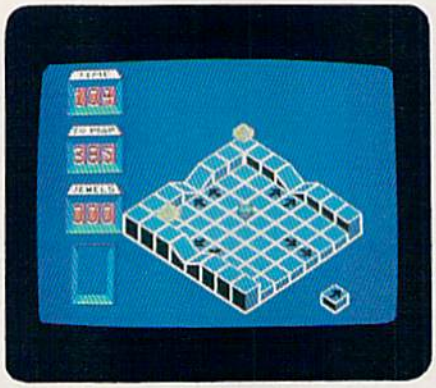
The newest division of Activision, Electric Dreams, can be thought of as the import section. Its stated purpose is to bring foreign software to America. The first three offerings are Spindizzy, The Rocky Horror Show and Zoids.

Spindizzy offers challenging play and enough fun to overcome its pretentious documentation. You're told that as Cartographer for Unknown Worlds, you've been assigned to map the artificial world that hangs in space in a newly discovered dimension. You're given a Geographic Environmental Reconnaissance Land-Mapping Device—Gerald—to assist you.

Gerald is a top, or a gyroscope or a marble, depending on how you wish it to be configured. Using your joystick, you must maneuver it over and through three-dimensional mazes.

Besides the fact that there are 386 different, and difficult, mazes, you must work against a time limit. Given the amount of time allotted at the start, there is no way to complete the game unless you also gather the sparkling jewels that reside in the mazes—each jewel collected will add to your time. Elevators, trampolines and other aids are included to help you go up and down.

Hazards exist in the form of water and ice. Because the maze resides in nothingness, the edge is also perilous.



Capture the jewels with Spindizzy, but beware of the edge!

Fall off and your top will reappear at the last place you had control. But be forewarned, you have only three lives, and then the game is over.

You can use the function keys to change viewpoints. Depending on the key pressed, the maze will rotate 90, 180 or 270 degrees.

Compasses point the way to the next successive screen. Should you need time to consider your next move, a pause feature lets you freeze the action for contemplation.

Gerald has its own momentum that must be overcome, or at least deflected, in order to run a maze or pick up a jewel.

With the exception of the scenario, the documentation for Spindizzy is brief. Graphics are very good—the geometric shapes of the mazes show you talents you may not have known your computer possessed—and the color scheme can be varied.

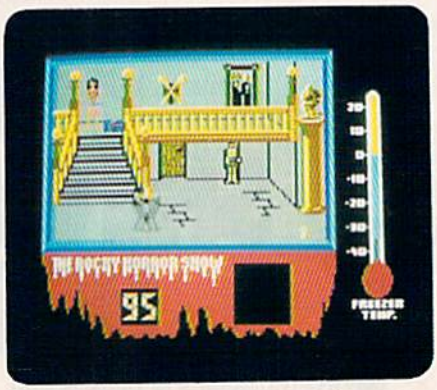
If your joystick reflexes have grown rusty from disuse, this game will loosen them and, just possibly, overload them. Spindizzy offers many challenges; it's a game that few will master quickly.

The Rocky Horror Show, based, of course, on the movie of the same name, is a game in which you must gather objects and make your escape, all while racing against a clock.

On a dark and stormy night, you and your fiance find yourselves in the home of the evil Doctor Frank N. Furter. Feeling something is amiss, your attempt to leave is thwarted when the doctor turns your fiance into stone. Only the DeMedusa machine can reverse this process. You have just 25 minutes to search the house for the pieces of the dismantled machine, reassemble them, thaw out your fiance and make your getaway.

After choosing whether you want to be Brad Majors or Janet Weiss, you move your character around by joystick, trying to avoid others who could bump into you or bump you off with a laser gun. Your outer clothing disappears if you collide with another character, leaving you to run around in your undies until you can find your duds. Without clothing, you are powerless to pick anything up.

At the bottom of the screen is a time clock and a box that displays any progress you've made in reconstructing the machine. The right edge of the screen shows a thermometer that indicates the temperature in the freezer. If the temperature rises to the thawing point, you'll find yourself in even more trouble when a thawed motorcycle freak appears.



Assemble the DeMedusa machine in The Rocky Horror Show.

Although the backgrounds are well drawn, the animated characters lack detail because of their small size. The fact that they are animated is a plus, however, because the intended effect of controlling a character in a movie is enhanced by the independent movements of the various characters you'll meet.

Now and then there is dialogue, which consists of lines recited by the movie's cult followers who have seen it enough times to know every word of the script. Rocky Horror will probably have the most appeal to these people.

Zoids, on the other hand, seems to bear little relation to its namesake. Zoids, as I recall, are robot-like creatures that resemble mechanical di-

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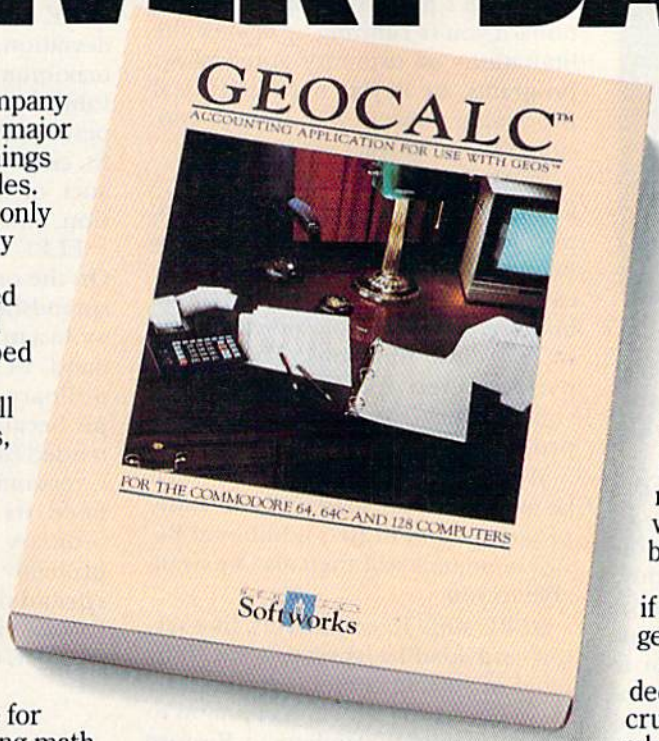

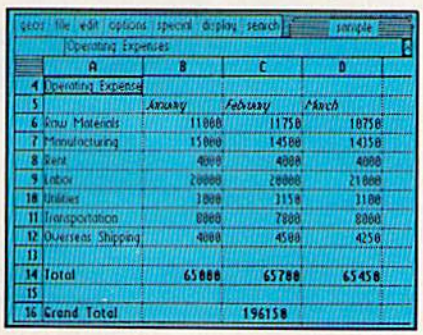
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nosaurs, but if you come to this game looking for these fearsome creatures, you're going to be disappointed, because they appear only briefly.

A history of the Zoids is presented in a lengthy prequel, beginning at the time they were first created, through to the arrival of you, an Earthman. Since you were rescued from the wreckage of your ship by Blue Zoids, you will, of course, fight on their side.

You've offered to take a new Blue Zoid, Zoidzilla, into the heart of Red Zoid territory, to do combat with Redhorn, the Red Zoid leader. Your ship is hit by a missile and pieces of Zoidzilla are scattered all over the landscape.

Do battle with Zoids.

The game becomes a matter of traversing a maze of canyons to find and reassemble the eight parts of Zoidzilla to carry out your mission.

The playing screen consists of a stylized control panel of your tank. When you call up the Map mode, you find your tank represented by a tiny, joystick-controlled square. You have at your disposal a variety of weapons, represented by icons. As an icon is selected, a pop-up window will inform you of further choices to be made—which weapon to employ or which defensive shield to erect.

Because the icons seem vague and each mode you select changes your options, I found doing serious battle to be more complicated than I want an arcade game to be.

Although I was disappointed by Zoids, the other two offerings from Electric Dreams have qualities that will earn them a good rating. Considered as a total offering by this new unit of Activision, two out of three isn't bad! *(Activision, Inc., 2350 Bayshore Parkway, Mountain View, CA 94043. C-64/$29.95 each, disk.)*

Ervin Bobo
St. Peters, MO

Echo Lake Basic Enhancement

B

Use of This Spreadsheet Will Enhance Your Statistical Power

The Echo Lake Basic Enhancement (ELBE) program adds spreadsheet commands to Basic on your C-64. ELBE isn't a traditional spreadsheet; it is designed to let you enter data directly into a spreadsheet-like, two-dimensional array. You can then process this data, using Basic programs and ELBE's powerful statistical functions. If you're running up against the limitations of ordinary spreadsheet programs, or if you need statistical processing power, you should consider this program.

ELBE is not copy-protected, but a key must be inserted in the joystick port for it to run. When the program prompts you to select memory allocation, be sure to leave enough room, because, with the notable exception of statistical functions, ELBE can't perform even the simplest spreadsheet operation without a Basic program.

When you enter Basic mode, you'll be able to create, load and run Basic programs, and ELBE's additional Basic commands will then also be available to you.

ELBE adds 15 commands, like saving and loading spreadsheets, four types of sorting commands and four disk commands. A Print command to print formatted numbers, a Restore command to bring back a program, and a List command to print the spreadsheet are all included.

Spreadsheet memory is organized into rows and columns, but here rows are called records and columns are designated as variables. ELBE records can contain a maximum of 255 characters. This is a serious limitation: Most spreadsheets let you enter up to 2047 characters in a row.

ELBE records can be divided into 99 variables. The width of a variable can be given a name, such as Address or Age—whatever the application calls for. ELBE variables can be referenced in a program and assigned values just like normal Basic variables. The cells can only contain text or numbers, not formulas, as in ordinary spreadsheets. Up to four ELBE spreadsheets can be stored on disk, and their variables can be accessed just as if they were in memory, which is a real plus.

ELBE's editor lets you enter data directly into spreadsheet memory. The editor has 23 commands that let you move about the spreadsheet, insert and delete records and edit variables. Special features include automatic decimal alignment of numbers, a numeric keypad and a Fast Entry mode.

The 26 statistical commands that must be loaded from disk with the Get command are what really make ELBE shine. The statistical functions that ELBE can perform include standard deviation, standard error, minimum, maximum, frequency of the model value, distributions, rank orderings, percentiles, chi squared, goodness of fit, cross tabulations, analysis of variance or covariance, multiple regression, and correlation matrix.

ELBE's strength is also its weakness. On the one hand, it can perform any spreadsheet function, but you must write a program to do it. On the other hand, ELBE can do many things an ordinary spreadsheet cannot do, simply because you have access to an extended Basic programming language. I recommend this program if you need its special features, but for ordinary spreadsheet work, you are probably better off with a standard spreadsheet program. *(Echo Lake Laboratories, PO Box 169, Pascoag, RI 02859. C-64/$49.95 disk.)*

Robert Rockefeller
Langton, Ontario, Canada

Shard of Spring

C+

Don't Blow Your Chance To Become a Hero

The ultimate goal of this game is to get the Shard of Spring out of the clutches of Siriadne. The Shard is the piece of the LifeStone that has kept

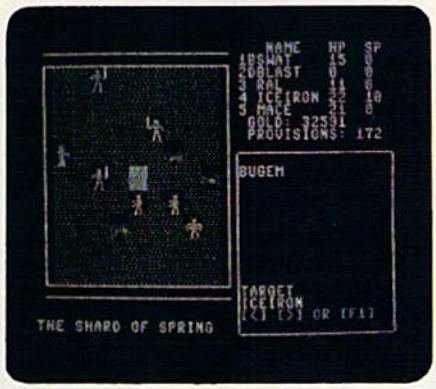
springtime year-round on the island of Ymros. Since Siriadne took possession, the islanders have been forced to pay tribute—gold, food and sacrifices—to maintain the good weather.

The sacrifices grow more unbearable by the day, and the wealth of the island is nearly depleted. It's up to your little party of adventurers to rescue the denizens.

When the game is first booted, you're faced with the choice of loading a party already created, going to the character utilities or picking from the maintenance utilities.

A party can consist of up to five characters and five separate parties can be saved. Once a party is formed, it can be disbanded entirely, but no new members can be added. Four is probably the perfect number for a party, and variety among the members is the key to survival.

The five races of characters are human, dwarf, troll, elf and gnome. Dwarfs and trolls can only be warriors, elves and gnomes can only be wizards, but humans get their choice of station. Each character is rated for five traits—speed, strength, intellect, endurance and skill. There are also levels of toughness, hit points, spell points and experience.



Your goal is to rescue the Shard of Spring from Siriadne.

A major complaint regarding this type of adventure game is that the lower level characters usually have very little money, power and endurance. This makes it difficult to get a character to a second or third level. What usually happens is that a character will run from trouble, just trying to survive and gain enough time to acquire a small amount of wealth, power and smarts—I don't consider that as computer-gaming fun.

Shard of Spring falls into this trap. One of the first adventures you'll attempt is to seek out and defeat Devir the Destroyer. Unless your luck is better than mine, you'll need some good fortune as well as perfect strategy to have any, let alone all, of your party members survive.

Should the characters die, they will be lost forever to disk. The next time you play, their names will be wiped out of existence.

The graphics of the game are functional, but not spectacular. The left two-thirds of the screen depicts the action while the other one-third gives the necessary information.

Shard of Spring isn't exactly a frontrunner in The Game of the Year voting. However, it will easily quench the thirst of hungry adventurers who need more challenges, more worlds to conquer and more games on their shelves. *(Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043. C-64/$39.95 disk.)*

Rick Teverbaugh
Anderson, IN ■

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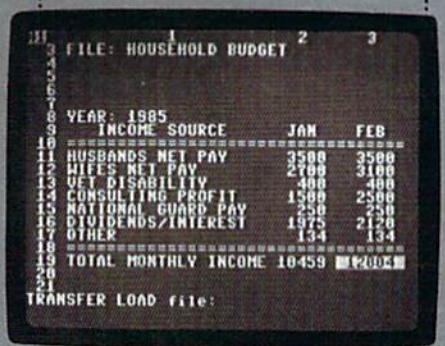

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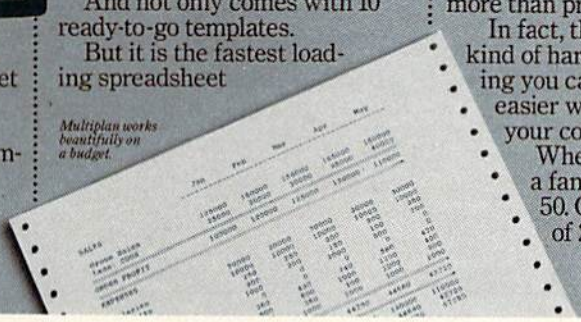


If, like a VW Bug, your floppy disks lack the capacity you need, step up to a hard disk drive, the Cadillac of memory storage for personal computers.

PHOTOGRAPHED BY LARRY DUNN

Hard Diskovery

By JAMES OLDFIELD, JR.
and ART LEWIS KIMBALL

There are currently three hard disk drives being sold for use with the Commodore C-64 and C-128, and two more are expected on the market later this year. If you're involved in data-intensive computer applications, you should consider a hard drive to decrease the amount of disk swapping you must do and to increase the speed of accessing and saving data. Many BBS operators use a hard disk drive to handle large amounts of data. Schools and small businesses, too, tend to use hard disk storage for its speed and large capacity.

We've recently completed tests on the three available drives, with the objective of helping you decide which would be the best for your needs. This article describes the results of those tests and offers a few comments on the drives that are expected soon.

The machines now available are the ST10C from Computer Specialties, Inc., (CSI), the 1010 from JCT and the Data Chief HFD-20 from InConTrol (ICT). Those in the offing are Xetec's Lt. Kernal and Progressive Peripherals' Device Nine—"The Vault." The Lt. Kernal is a reincarnation of the drive of the same name that was originally developed by Fiscal Information.

Table 1 lists these machines, with their capacities, prices and manufacturers' addresses. The table also indicates the drives' compatibility with the C-64, the C-128, or both.

We've been working with hard disk drives since 1984, when we started using the Commodore 9090 hard drive (no longer available) as the core of our Punter BBS, and we've learned to appreciate the advantages of these machines. Their huge data storage capacity and, in some cases, increased speed open whole new worlds to both power and casual users.

The Basics

A hard disk drive differs from a floppy disk drive (such as a Commodore 1541) in two respects, both re-

lated to the medium of data storage. A hard drive, also known as a fixed disk drive, contains one or more rigid platters on which data is stored. These platters serve the same function and are about the same size as the disk found in a standard floppy.

Table 1. *Manufacturers and prices.*

Computer Specialties, Inc. (CSI)
PO Box 1718
Melbourne, FL 32902
*ST10C**
C-64, 10 megabytes; $895

JCT
PO Box 286
Grants Pass, OR 97526
JCT-1000
C-64 and C-128, 3.7 megabytes; $595
JCT-1005
C-64 and C-128, 5 megabytes; $695
*JCT-1010**
C-64 and C-128, 10 megabytes; $795

InConTrol, Inc. (ICT)
103 Baughman's Lane
Suite 301
Frederick, MD 21701
Data Chief HFD-10
C-64 and C-128, 10 megabytes; $895
*Data Chief HFD-20**
C-64 and C-128, 20 megabytes; $995

Xetec, Inc.
2804 Arnold Road
Salina, KS 67401
Lt. Kernal
C-64 and C-128, 20 megabytes; $899.95

Progressive Peripherals & Software, Inc.
464 Kalamath St.
Denver, CO 80204
Device 9–"The Vault"
C-64 and C-128, 10 megabytes; $899.95

*—Indicates the drives reviewed in detail.

Table 2. *Load times.*

Commodore 1541, regular load	88 sec.
Commodore 1541 with Fast Load	17.16 sec.
CSI ST10C, regular load	87 sec.
JCT 1010, regular load	77 sec.
ICT hard drive, regular load	87 sec.
ICT hard drive with Fast Load	26.16 sec.
ICT floppy drive with Fast Load	17.31 sec.
Preliminary test of Xetec, regular load	2.5 sec.

Table 3. *Software tested.*

Copy-All, by Jim Butterfield
Public domain
Worked on all three drives.

Monopole (130-block version), original by John O'Hare
Public domain
Worked on all three drives.

Profile 64
Spinnaker (formerly from ProLine)
Worked on the CSI and ICT, but not on the JCT.

Pocket Writer 64
Digital Solutions
Worked on all three drives.

WordPro 64
Spinnaker (formerly from ProLine)
Worked on all three drives.

SuperBase (CSI version)
Precision Software
Worked on the CSI.

SuperScript (CSI version)
Precision Software
Worked on the CSI.

ProTerm 64
King MicroWare
Worked on all three drives.

VidTex
CompuServe
Worked on all three drives.

CommTerm
Public domain
Worked on all three drives.

However, information can be stored much more densely on the rigid platters, so they can hold a lot more data. The capacity of a ten-megabyte drive is 10,000,000 bytes, whereas one side of a Commodore-formatted floppy will hold only about 170,000 (170K) bytes.

The rigidity is also responsible for the second difference: speed. Because it's stiff, the hard disk platter doesn't wobble or flutter as it spins, so it can travel at 3000 revolutions per minute, compared to around 300 rpm for the floppies. However, we found that some sacrifice speed to achieve greater compatibility with Commodore systems and software.

See Table 2 for loading times clocked on these units in comparison with the Commodore 1541. It shows the average time, over four loads, for each drive to load the 130-disk-block Monopole (computer Monopoly) program. To simulate a normal operating environment, we filled all three hard drives with approximately 20,000 blocks of extraneous information before the loads were timed.

While the extra speed on drives that have it is an advantage for data access and storage, it does create a problem. The spinning platter produces a vacuum that draws the ultra-sensitive read/write head to within a few thousandths of an inch of the disk surface. At these speeds, even a particle of cigarette smoke between the head and the disk could seriously damage both.

Table 3 lists the programs we used for testing software compatibility and the results of those tests. There are built-in trade-offs between a hard drive's compatibility with software and its flexibility and speed, and each manufacturer handles the problem differently. With an investment of this size, we strongly recommend that you choose your software first and then test it on any hard drive you might be thinking of buying.

The CSI ST10C, JCT 1010 and ICT HFD-20 share many features. Each offers a standard serial port that connects directly to your C-64 or C-128; provides a hardware device-number switch so you can use multiple drives; supports standard Commodore program, sequential, user and relative files; and lets you "park" the read/write head to prevent damage while moving the drive.

The JCT and ICT drives have a built-in cooling fan, while CSI chose to do without the fan to reduce the possibility of outside contamination. With all the drives on the same desk, we found that none of them overheated.

The CSI ST10C

The CSI ST10C has been on the market for nearly two years, longer than any other third-party, Commodore-compatible hard disk drive. It works with all Commodore

computers except the Amiga and stores up to ten megabytes of data. Two serial bus connectors and a Commodore IEEE interface come in the box. Because of the available IEEE connection, the ST10C is compatible with the Punter BBS.

This drive provides a back-up feature that, at the press of a button, automatically dumps all its data to a properly connected floppy drive. Another handy feature is a format enable/disable switch on the back of the unit. When the switch is in disable position, you can't format the disk—a valuable feature that *all* drives should have.

CSI sells versions of Precision Software's SuperBase and SuperScript and CMS's General Accounting System to be used with the ST10C. The two Precision packages automatically copy themselves to the hard disk when you first boot them from the floppy. Although the load times are slightly longer than for other versions of these programs, the time you'll save by not having to swap disks will be worth it.

As with the Commodore 9090 hard disk series, the directory on the ST10C allows for an unlimited number of files. This is an improvement over the 1541's 144-file limit, but looking through a seemingly endless directory can get tedious. At one point, we loaded and saved the directory file, only to find it was 110 blocks long.

Although we didn't have the opportunity to try it, CSI says that their disk operating system (DOS) provides for multiple users. We did try the ST10C with Access's Mach 5 and Epyx's Fast Load cartridges, as well as with some commercial and public domain software speed loaders; it didn't work with any of them.

The CSI manual provides easy instructions for installing and using the ST10C, and the machine comes with a 90-day warranty.

The JCT 1010

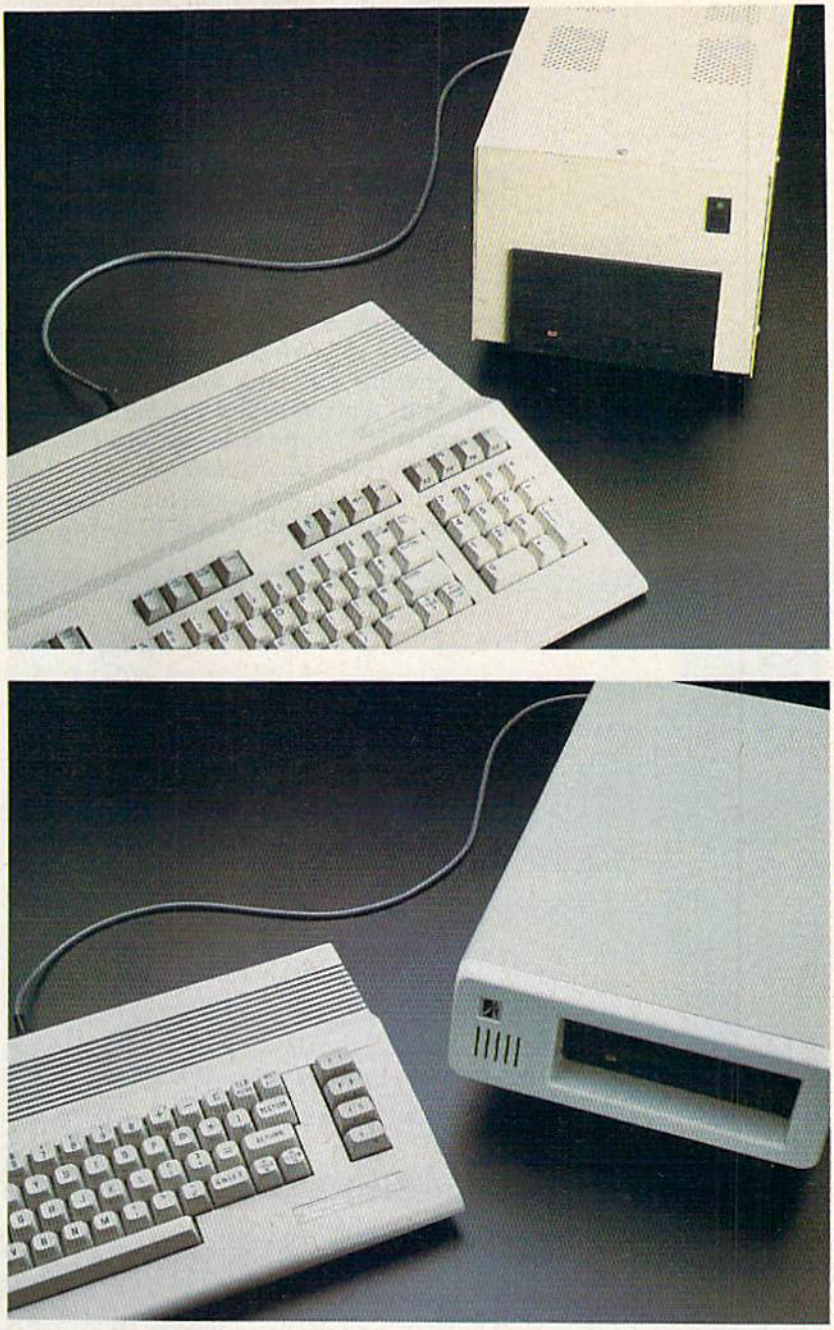
The JCT 1010 is compatible with both the C-64 and the C-128 and is another ten-megabyte unit. Its DOS appears nearly identical to that of the Commodore 1541. This was the only hard drive we tested that supports random access files (similar to relative files, but without an allocated length on the disk); you can perform direct block-access commands, such as Block Read and Block Write, directly from Basic.

Like the CSI ST10C, the 1010 wouldn't work with the fastload cartridges and software speed loaders we tried. However, it's faster than the 1541 all by itself. Unlike the ST10C, it doesn't have a hardware format-disable switch, but the command channel Format command ensures that you won't accidentally format the disk.

The 1010 DOS provides for 255 subdirectories within the main directory, to make managing hundreds or thousands of files more reasonable. With this feature, you could, for example, create word processor, database, arcade game and adventure game subdirectories, so you wouldn't have to look through all your arcade games for that final version of last semester's research paper.

The 1010 also provides both temporary and permanent software device-number changes. By sending a line to the command channel, you can tell the drive that its number is 9 or 11 or 20, and it will stay that way until you reset the drive (if you used the temporary change), or until you send it a command changing the device number again (if you used the permanent change).

The manual that comes with the JCT gives



Top:
The CSI ST10C.
Bottom:
The JCT 1010.

easy and direct installation and operating instructions, plus examples of creating relative and random access files, direct Block Access commands and elementary sequential file handling. It also provides, for the advanced programmer, memory maps with entry points into the DOS routines. The 1010 comes with a five-year limited warranty.

The ICT Data Chief HFD-20

The ICT Data Chief HFD-20 includes an Indus GT floppy disk drive, a hard disk drive and a hefty 135-watt power supply in a PC-type housing. Opening the hinged top reveals both the Indus and the hard drive, a controller board and space for installing another controller board and two more half-height drives. Using two additional 20-megabyte drives available from ICT, you can expand the HFD-20 to 60 megabytes (the equivalent of about 350 Commodore 1541 single-sided floppies). There are two Commodore serial ports on the front of the box for connecting the unit to your computer system.

Top:

The ICT Data Chief.

Bottom:

Xetec's Lt. Kernal.

We found that the Indus floppy drive worked with all the copy-protected games and utilities we tested, some of which possess exotic and difficult DOS protection schemes. General purpose disk copiers will work fine on the Indus, too.

The hard drive comes formatted and partitioned into 120 664-block segments. You can switch easily among these partitions by sending the partition number you want to the command channel. While this feature is handy for separating data, it somewhat limits the effective size of the disk; unless, as the DOS allows, you chain the partitions together for greater effective capacity. Loading programs from the HFD-20 is not noticeably faster than from a 1541, but the Epyx Fast-Load and Access Mach 5 cartridges work with it and will speed things up.

The HFD-20 has five operating modes to give you some flexibility and control. Mode 0 accesses a particular partition, and mode 1 enables and disables a partition chain. Mode 2 designates the source/destination drive when you're using the hard switch between the floppy and hard drives with a fast-copy program. Mode 3 switches over to the hard drive after you boot protected software from a floppy. Finally, mode 4 initializes the chain set-up position. The DOS also recognizes HCF as a command to copy hard drive partitions from the HFD-10 onto a formatted floppy (similar to CSI's one-button backup) and HP as a command to park the head for transporting the drive.

A number of utilities come on the HFD-20 disk. They include most of the utilities from the Commodore 1541 Test/Demo disk, plus hard drive configuration programs for designating which partition to use when the system is powered up and for copying files from floppy disks to specific hard drive partitions. Also on the disk are two versions of the popular public domain program, Disk Doctor Deluxe (adapted by Kevin Hisel), that work within a partition of the HFD-20 as if it were a floppy.

We had only a brief glimpse of ICT's preliminary manual, but it seemed to logically display easy and direct DOS commands. The HFD-20 comes with a one-year warranty.

The Lt. Kernal and "The Vault"

The Lt. Kernal from Xetec is a modified version of Fiscal Information's original Lt. Kernal, which has been around for some time. At this writing, the Xetec product is awaiting FCC approval, and the production

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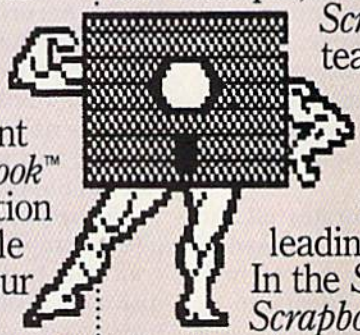

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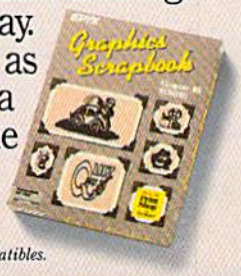

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Using its own interface and custom DOS, the Lt. Kernal is a true programmer's development system.

version of its DOS isn't yet finished. However, on the basis of working with the Fiscal Information unit for about two years and examining a preproduction sample of the new machine, we can offer a preliminary description.

Using its own interface and custom DOS, the Lt. Kernal is a true programmer's development system. In C-64 mode, it loads and saves roughly 65 times faster than a 1541 (130 blocks in 2.5 seconds), and in the new 128 mode, it's supposed to operate 135 times faster. It also locates programs in the directory instantaneously.

The Xetec version incorporates all the features of the original Fiscal Information drive, plus a few others. As in the original, it can be partitioned into a maximum of ten logical units, with up to 15 separate user areas in each.

Also new is an extended DOS that provides over 40 commands, including a life-saving "oops" for recovering a file you've just scratched. The DOS lets you load and run programs by just typing the name of the file, then pressing return, and you can query files to determine their type, size and load address. In addition, the DOS will automatically load and run a file named "autostart," which can be any file you wish, every time you reset the computer. Another new feature lets you capture commercial programs and store them on the hard disk, and a GO128 command places the computer and hard drive in 128 mode.

Another new Commodore-compatible drive, announced but not yet available, is Progressive Peripherals' Device Nine—"The Vault." According to company officials, the unit is scheduled for release in the summer. We haven't seen one of these machines, but the press release we received says this drive requires no interface (using the serial port instead) and is dip-switch selectable for device numbers 8–11.

The release also states that "The Vault gives complete, automatic protection of your data by inserting 'shields' between the disk and heads whenever the computer is turned off, and retracting the carriage to the edge of the disk. This protection system has withstood 40g shock tests, without damage to the data or platter."

As soon as these drives are commercially available, *RUN* will publish a follow-up article comparing their features.■

James Oldfield, Jr. (1212 N. Hagan St., Champaign, IL 61820) is the editor-in-chief of the Midnite Software Gazette. *Co-author Art Lewis Kimball is an associate editor of the same publication.*

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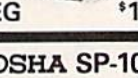

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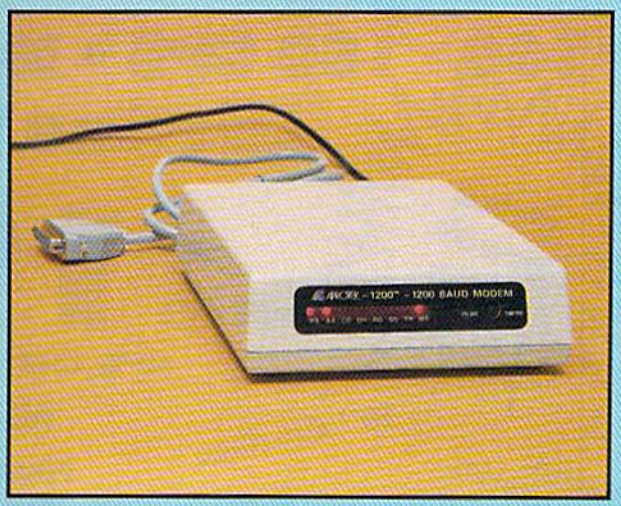

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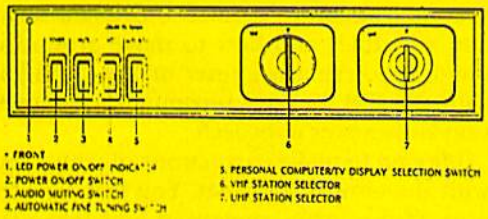
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Taxing YOUR COMMODORE

By JOSEPH SHAUGHNESSY

IF REVIEWERS GET MEDALS, I'm nominating myself for one. While the rest of you were watching football games on New Year's Day, I was redoing my 1985 Federal income taxes...eight times! That's how many tax packages I reviewed for this issue of *RUN*. Since the only way to test a tax program is to enter the data and use it, that's what I did.

My usual tax return is fairly complicated, because I use the 1040 long form, schedules A, B, C, E and W, and form 2441. This provided the tax programs with a pretty good workout.

The packages I reviewed were Tax Return Helper, Tax Master, It's Tax Time, Comtax, Tax Command Professional, Taxaid, Swiftax and The Tax Advantage. Some of them run on the C-64 and some on both the 64 and the 128. However, before going into their individual features, I'll give an overview of what they do and how they work in general.

None of these programs do the really hard part of preparing the tax return—gathering and sorting your financial records. However, you can interface two of them with other programs that are designed to assemble all this information as it accumulates during the year.

All the programs I tested arrived at the correct answer. The main differences between them showed up in ease of use and in the type of data entry format they used.

Data Entry

The programs employ two types of data entry format. One is question and answer, where the program asks you the same sorts of questions your accountant might ask and then plugs the answers into the correct locations on the tax forms and schedules. This format is easy to use, but you really don't get to see what's going on and how one item affects another. Also, the question sequence is irreversible. You can't go back to a previous question without starting over at the beginning, or at least at the beginning of the current set of questions.

The second type of user interface I would call a template format. You view each tax form, a portion at a time, through a window, and then enter your data just as if you were writing it on the tax form. You can jump from place to place on the form, and even from one form or schedule to another. The sequence of entering the data is entirely up to you, and there is provision for you to quit and come back later.

The template format is my preference, but I've been doing my own taxes for over 20 years and am pretty familiar with all the forms and schedules and how to move around in them. If you're a beginner or not confident with the IRS forms, I recommend the question-and-answer approach.

It's easy to make corrections in your input with the template format. You just view the area of the form concerned and make the correction right on the screen. Most of the question-and-answer type programs, on the other hand, have separate viewing and correction modes. First you view the results of your input, remember the line number to be changed and then go to the Correction mode to make the change. Some question-and-answer programs let you make corrections as you're entering data by pausing after every set of questions, displaying the answers to those questions and asking if you want to make any changes.

Some of the programs transfer data from the supporting schedules and forms to the

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1946

1040 form automatically, and some require you to take the results from the supporting forms and enter them on the 1040 manually. Also, some let you enter data in both upper- and lowercase letters.

Most of the programs allow you to enter only totals for the line items. For instance, if you've given to five charities, you have to add up the amounts and enter the total on schedule A, line 15a. It would be nice to just enter the five amounts and have the program calculate the total and put it on line 15a.

Printing the Forms

The final output from these tax programs are figures that can be entered on your income tax forms and schedules, preferably by your printer. The IRS will accept computer-generated facsimiles for all the schedules and forms except the 1040, provided certain IRS rules are observed.

The printouts come in three types, with some programs offering more than one. The first is the draft printout—a listing of the input to and output from the tax program for your records only. You can use the draft for manually entering the data on your IRS forms.

The second type of printout is an IRS-ready schedule or form that you can take directly from your printer and submit with your tax return. As I mentioned, the IRS will accept these for all but the 1040 form.

The third type of printout is done directly on the IRS forms and schedules. Even the 1040 can be submitted this way, since you're using the actual tax form and not a facsimile. There are three ways to print directly on the IRS forms. One is to tape the form to your tractor-feed printer paper or just feed it through your friction-feed printer.

Another way is to buy preprinted IRS forms on tractor-feed paper from a business supply store. The greatest difficulty with either of these methods is trying to get everything lined up just right on the printer.

A third, and more practical, way is to print on blank white paper, then position a transparent overlay of the IRS form over your printout and make a photocopy of the combination. The IRS accepts photocopies of their forms. You can purchase these transparencies at some office supply stores, or any copy center will make them for you on their duplicating machine for about $1 per page.

Operating Tips

When you first start using a tax program, it's a good idea to see how it works by running through its operation without entering any data. If you don't do this, you'll find yourself having to juggle the instruction manual along with your piles of receipts and checks.

Try out the printer functions to make sure everything is going to work all right. You don't want to painstakingly enter all your data and then find out you haven't selected the right printer options, or that you should have sent printer control codes before you started. Also, make sure you have at least one blank formatted disk to use as a data disk, if your program requires it.

One nice feature of all of the programs I reviewed is that they had no copy protection. I tested them all using a backup copy I'd made. It would be a good idea for you to do the same, keeping your original disk in a safe place.

All the programs disclaim any responsibility for the accuracy of your tax return. You should examine your forms for errors and omissions before sending them off to the IRS.

Program Reviews

What follows are brief reviews of the eight tax packages I tested. All the programs worked without any troublesome bugs, although some impressed me as more polished than others. I can say that using any of these programs is preferable to doing your taxes by hand. Table 1 shows you a list of the forms and schedules each program prepares and the types of printouts it produces.

About half the programs I reviewed were for the 1985 tax year and half for 1986. The 1986 versions should be available for all of them by the time you read this article.

Tax Return Helper, Professional Version

Tax Return Helper comes in two versions, standard and professional. I tested the latter. In either case, the package employs the template format, which means you need some familiarity with the tax forms and schedules in order to use it. You move around the template by using function keys, and pressing the help key displays a list of the command keys.

Both versions produce a draft type of printout, and the only difference appears to be that the professional version also prints on IRS forms and uses transparencies. With the standard version, you must enter the results by hand on your IRS forms.

The 1985 edition I had didn't automatically transfer results from form to form, but, according to the manufacturer, KSoft, the 1986 edition does. The program needs and supports only one disk drive, because there's room for your tax records on the program disk.

Tax Return Helper is written in Basic and can be listed to the screen or printer. It's a big program, and hence has an occasional annoying pause for garbage collection.

The package includes Tax DBase, a separate program that builds itemization files to total a group of related receipts and then accesses these totals from within the tax program.

Overall, the Tax Return Helper is easy to use, though sometimes a little slow.

Tax Master

Tax Master is a menu-driven program that follows a question-and-answer format. It won't let you back up during data entry, but you can abort and start over again. After you finish entering your data, you can access Display mode to view the data and results, then enter Edit mode to change individual items.

This program transfers data automatically from one form to another. The printout is in Draft mode only, so you have to transfer the final output to your IRS forms by hand.

The 1986 version of Tax Master includes a built-in calculator, which I haven't tested, since the 1985 version I possess didn't have it. The program supports either one drive or two, and it requires a separate data disk.

Tax Master is nicely set up to handle multiple taxpayers on the same disk through a system of codes you assign to each taxpayer. Also, each person can have more than one

Table 1. *Forms, schedules and types of printouts.*

Form or Function	Tax-Aid	Tax Advantage	Tax Command	Tax Master	It's Tax Time	Comtax	Tax Return Helper	Swiftax
Schedules:								
Form 1040	•	•	•	•	•	•	•	•
A—itemized deductions	•	•	•	•	•	•	•	•
B—interest/dividends	•	•	•	•	•	•	•	•
C—business income	•	•	•	•	•	•	•	•
D—capital gains		•	•	•	•	•	•	•
E—supplemental income		•	•	•	•	•	•	
F—farm income				•				
G—income averaging	•	•	•	•	•	•	•	•
SE—self-employment		•	•		•		•	•
R—retirement income			•					
W—two-income adjustment	•	•	•		•	•	•	•
Forms:								
2106—employee expenses		•	•				•	
2119—sale of residence			•					
2441—child care expenses	•	•				•	•	•
3903—moving expenses			•					
4562—depreciation		•		•	•		•	
6251—alternative minimum tax		•						
Printout modes:								
Draft copy		•	•	•				
On IRS Forms		1040	•		•	1040	•	•
Makes IRS Forms (except 1040)	•	•				•		

schedule, if, for instance, he has more than one business.

Tax Master is written in Basic and can be listed. Overall, this program worked well for me, and I found it easy to use. My only complaint is the lack of an IRS-ready printout.

It's Tax Time

It's Tax Time is a shareware program, where you order the package at a minimal cost and then pay more if you find it worthwhile. This program is so easy to use that there isn't even a manual. Execution follows a simple question-and-answer format, stepping you through the 1040 form and asking at fairly frequent intervals if you want to make corrections in the data you're entering.

It's Tax Time will print on IRS forms directly and use transparencies. It will also display the output on the screen for you to copy to your IRS forms by hand; there's no Draft mode printout.

The program transfers data automatically between the various forms and schedules. You can also save your data to disk, but upon reloading you can only view the data or print it out. You can't make corrections! That's a serious flaw. If you want to correct any item on your return, you have to re-enter *all* of your data by hand.

One especially nice feature of It's Tax Time is that it produces values to enter in the worksheet sections of the 1040 manual. Also, if you live in California, you'll be pleased that it does the California 540 form in addition to the Federal forms.

The code is written in Basic, is listable and runs fairly fast. In spite of the fact that you can't change reloaded data, It's Tax Time does work, and you can't beat the price. If you order it, remember that shareware works on the honor system. If you use the program to do your tax return, you should send the author more money.

Comtax

Comtax is written in compiled Basic for speed. So you begin by running a startup program, where you choose the forms you need and supply basic information to be used on all of them.

The main program begins with a menu on the first screen, but thereafter the format is question-and-answer. You can make corrections at the completion of each schedule or after printing out the form, and data transfers automatically from one form to another.

Comtax will print right on the 1040 form, or you can use transparencies. As a matter of fact, transparencies for the 1040 are supplied with the program—certainly a nice feature. Other schedules are printed out as facsimiles, ready to submit to the IRS.

One feature I didn't like is the necessity to print out each schedule immediately after completing it, because data for individual schedules is not saved to disk. This means you can't come back later and change a schedule without re-entering all its data. However, the data from supporting schedules is saved to disk, for use by the 1040 program.

I don't like not having my data saved to disk, but the inclusion of transparencies for the 1040 and the IRS-ready schedule printouts make Comtax a nice package.

Tax Command Professional

Tax Command Professional uses a template format, so you can jump all over the forms and the many schedules the program provides and enter data in any order. It offers fairly automatic menu-driven operation, with the menu always on display at the bottom of the screen. There is some automatic transfer of data from form to form.

Tax Command Professional provides a built-in calculator, which adds lists of receipts and enters the totals on the appropriate lines of the forms. You can use the calculator function to go back and add a forgotten receipt to a line item, even after you've moved on in the program.

Happily, you can save your data to disk and reload it later for corrections. The program supports only one disk drive, but there's plenty of room on the master disk for your files, so that's no problem.

Separate print files are used to print out directly on the IRS forms, and a built-in function that prints one tiny x will help you align your forms in the printer. The program will also print out a draft copy for your records. The printouts are in upper- and lowercase letters.

I encountered one small bug in Tax Command Professional: It tried to credit my self-employment income to my wife on schedule W. However, I was able to fix this easily on the screen by re-entering the correct data.

The code for this program appears to be written in machine language, so execution is speedy.

Overall, I found Tax Command Professional easy to use and well done. The manufacturer, Practical Programs, also publishes Tax Command Planner, which can use data files created by Tax Command Professional.

Taxaid

Taxaid comes in versions for the C-128, the C-64, the VIC-20 and the Plus/4. I tested

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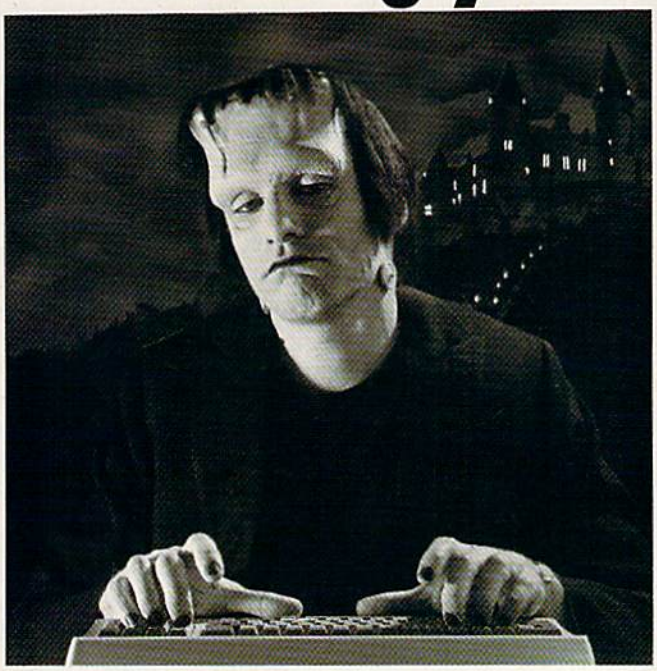

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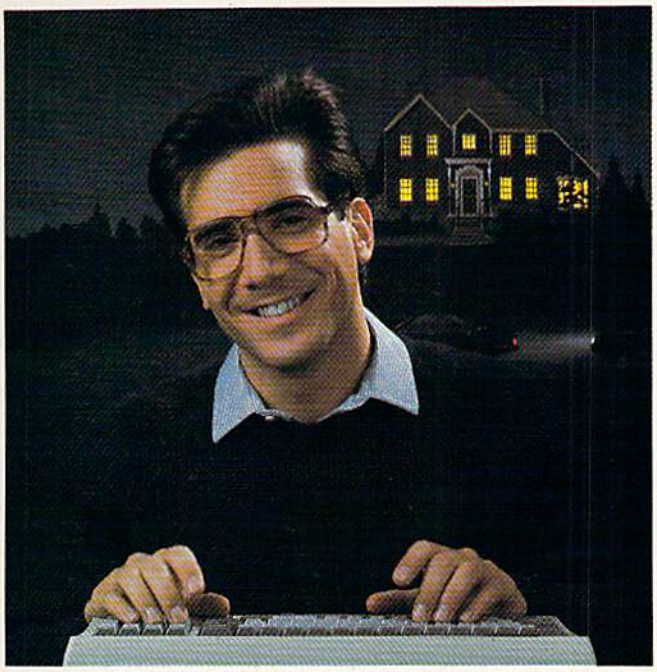

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the 128 version and found that it doesn't take advantage of the special features of the 128. In fact, it runs just fine on the C-64. There's no fancy screen display, and my 40- and 80-column monitors both handled the program well, except that the display bunched against the left side of the screen.

Taxaid uses a kind of question-and-answer format in which you can control the sequence of questions—a definite plus. Also, corrections are easy to make. However, it complicates data entry unnecessarily by what appears to be an attempt to thwart software piracy, or perhaps to conserve computer memory. Data entry can also be repetitive. For instance, you have to input your name and other vital information for almost every schedule.

This is a program that, for all practical purposes, must be used with the manual, because all the questions you have to answer are only represented by brief, numbered items on the screen. The manual contains the actual questions.

In all fairness, this scheme isn't that bad to work with, since you'll save time by answering only those questions that are appropriate. However, the process would be less confusing if the question numbers matched, in some way, the line numbers of the IRS forms.

Taxaid doesn't swap data from form to form. You can save and reload your data and make changes at a later time, and you can choose to display either your data or the final results on the screen.

All of Taxaid's printouts, except form 1040, are suitable for direct submission to the IRS. For form 1040, you get a draft copy and must transcribe the data to the 1040 by hand.

Taxaid is written in Basic and can be listed. All in all, it's not a flashy program, but it does the job.

The Taxaid company also produces a program called Future-Tax for use in tax planning for 1987 and 1988.

Table 2. *Manufacturers' addresses and prices.*

Tax Return Helper/C-64
KSoft
845 Wellner Road
Naperville, IL 60540
312-961-1250
$45 for the professional version, $33 for the standard version; yearly updates, $29.50 and $21.50; $1.50 for shipping and handling.

Tax Master/C-64
Master Software
6 Hillery Court
Randallstown, MD 21133
301-922-2962
$30; comes with a coupon for a discount off next year's edition.

It's Tax Time/C-64
L. J. Fischer
2797 Medford Ave.
Redwood City, CA 94061
415-368-7930
Shareware—send $5 for the program and agree to send an additional $30 if you like it and use it.

Comtax/C-64
MILO Software
PO Box 569
Jamaica Plain, MA 02130
617-292-6465
$29.95; yearly updates, $17.50.

Tax Command Professional/C-64
Practical Programs
PO Box 93104
Milwaukee, WI 53203
414-272-7227
$50; yearly updates, $25; (add $2 for shipping and handling).

Taxaid/C-64
Taxaid Software
606 Second Ave.
Two Harbors, MN 55616
218-834-5012
$39.95 on tape or disk; yearly updates, $16.50.

Swiftax/C-64
Timeworks
444 Lake Cook Road
Deerfield, IL 60015
312-948-9200
$49.95; yearly updates, half price.

The Tax Advantage/C-64
Double Eagle Software
2210 Wilshire Blvd., Suite 875
Santa Monica, CA 90403
213-459-9748
$59.95; yearly updates at a discount.

Swiftax

No doubt about it, Swiftax is a slick, professional package. I tested the C-64 version, although there evidently is a version available for the C-128 in 80-Column mode.

This is a menu-driven program, and its question-and-answer format leads you by the hand through all the forms and schedules provided. A brief but succinct explanation appears on-screen with each question, and the manual is one of the best.

In addition to being easy to follow, Swiftax lets you correct errors after every few questions, and it provides an escape function. However, if you use the escape key, you'll have to start over again at the beginning.

This program automatically transfers data from one form to another, and you can select screen colors of your liking. The printouts are made directly on the IRS forms and schedules.

Swiftax requires a data disk in addition to the program disk, but, unfortunately, it supports only one disk drive or a dual drive, not two drives. You can save and reload your data and make corrections to previously saved data easily. Also, there's an optional fast-loader built into the program.

This program lacks a schedule E. However, it can do returns on the 1040A and 1040EZ forms, and the disk includes a separate loan amortization program to be used with Swiftax. The manufacturer, Timeworks, supplies a toll-free hotline for user support, and a guarantee that they'll buy you a copy of any other tax preparation software you think works better for you.

Overall, this is one of the best question-and-answer-format tax packages I've seen, and a good choice for beginners.

The Tax Advantage

I have to admit to a slight prejudice here, because The Tax Advantage is the program I use for my returns. It's a template-format

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program, which means you can move about all the schedules and forms at will, but you need to be experienced at doing taxes to use it well. Operation is menu-driven, with a help key and an on-screen menu at all times, and there's a demonstration routine on the disk to show how the program works.

Making corrections with The Tax Advantage is very easy—you just type over the old number. Also, the line numbers on the sections of template displayed on the screen conveniently correspond to the tax form line numbers. Also, data from supporting schedules and forms is transferred to the 1040 automatically. This program calls for both the program disk and a data disk, and it supports one or two disk drives.

Tax Advantage printouts, except for the 1040, are IRS-ready facsimiles. For the 1040, you can print directly on the form or use transparencies. The program will also provide draft printouts for your records.

I consider the best feature of The Tax Advantage to be its itemization function. At any line number, you can press the I key to access a subroutine for entering individually all those receipts and cancelled checks, including both a text description and the amount.

When you finish itemizing, the total is placed on the line you were at on the IRS form. You can also print out these itemization statements and keep them for your records, and you can even send some of them in with your tax return as backup information. If you attempt to itemize an item that needs a supporting schedule, the program takes you to that schedule for completion.

The Tax Advantage manual is excellent, with seven pages of printer information for just about any kind of printer you might be using. The program can use data from the Home Accountant (from Arrays, Inc.) as input, and there's a mode for playing "what-if" games by temporarily changing any value without losing the original value from memory.

The manufacturer, Double Eagle Software, provides a phone number for user support, although it's not toll-free. They also provide a separate program for doing California taxes.

The only problem I find with The Tax Advantage is that its many disk accesses make it slow at times. I hope the authors will write a version for the C-128, which would solve the speed problem. Overall, this is an excellent, user-friendly program.■

Joseph J. Shaughnessy is a professional engineer and amateur computerist. He has authored a shareware disk series, as well as numerous articles on Commodore computing. Address correspondence to him c/o Reynolds, Smith & Hills, PO Box 4850, Jacksonville, FL 32201.

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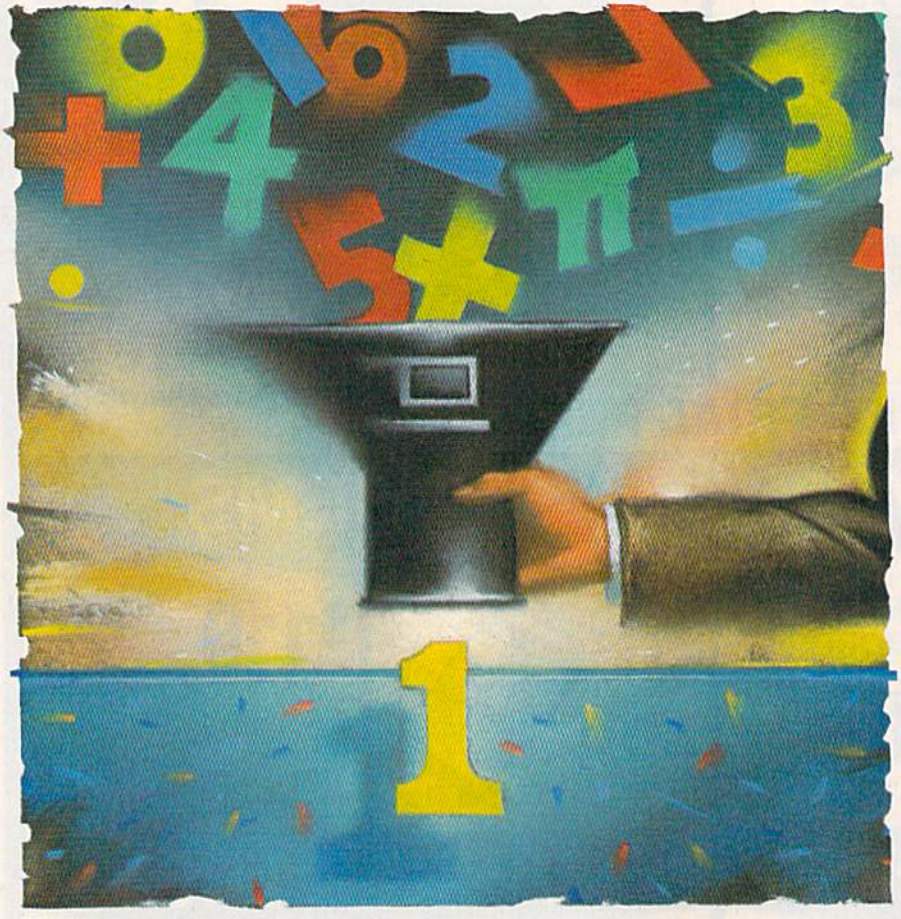
DFCALC

Here's the program you've been waiting for—the Datafile accessory that performs calculations and produces spreadsheet-like reports.

By MIKE KONSHAK



DFCalc is a companion program to Datafile. Type in the listing and save it to a disk that contains Datafile and DFPrint (from the February and March 1987 issues, respectively). You can load DFCalc from the main menu of Datafile by pressing P, for Print option, and then C in the resulting option menu; or load it in from Basic by typing LOAD"DFCALC",8 <return> and RUN <return>.

DFCalc enables you to use your Datafile record-file data to produce spreadsheet-like reports. Since the program provides for considerable flexibility in designing your calculated reports, many applications are possible.

Calculations are performed on only one record at a time within a row of the report. However, the entire contents of a column can be totaled or averaged. Various methods of justification are provided, as well as many mathematical tokens to expand the capabilities of your printed document.

The following is a more comprehensive description of DFCalc's capabilities:

1) A header consisting of up to four title lines can be printed at the top of the first page of your report.

2) You can define up to 16 columns in your report. The number of columns possible will depend on the width of each column and the number of characters your printer can fit across the page.

3) Columns can contain:

a) The record number.

b) The contents of a field or data within a record.

c) The contents of another column within the current row.

d) An equation, the results of which will be printed within the column.

e) A running total of the data found in a previous column.

4) Equations will perform operations using the following operands:

a) Numerical content of a field within a record.

b) Numerical content of a previous column within the row.

c) Numerical constants or values, such as 100, 3.14159 . . . (pi), 469.65, 2.6769E – 3, 8.965E10, and so forth.

5) Equations can perform opera-

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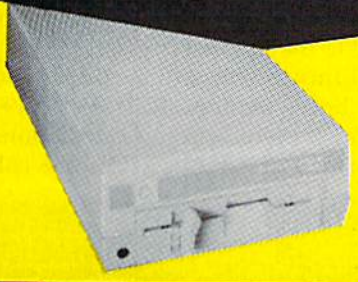

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tions employing up to three of 47 operators, such as +, −, ×, ÷, ↑, sin( ), log( ) and sqr( ). Included among these are conversion operators that will convert inches to millimeters, degrees to radians, and so on.

6) End-of-column (EOC) operations can be defined as follows:

a) No operation (NOOP), which doesn't print any values at the end of a column.

b) Calculate the sum of all the data printed in the column.

c) Calculate the average of all the data printed in the column (the total divided by the number of records printed).

7) Column justification can take the following forms:

a) Left (for alphanumeric data).

b) Right (for alphanumeric data).

c) Currency (numeric data, right-justified, two decimal places).

d) Decimal (numeric data, right-justified, zero to eight places).

e) Percent (multiplies contents of column by 100).

DFCalc Instructions

DFCalc will produce accurately calculated reports from your Datafile record files, assuming you design the report format correctly. For the purpose of learning the program, we'll create a fictitious record file as an example.

Deciding on a Report

Let's assume you've previously created a record file called Inventory with Datafile. It will appear on the disk directory as DF] INVENTORY. The special characters preceding the right bracket identify the sequential file as having been written by Datafile. The Inventory file will have the structure shown in Figure 1. The five records in the sample file appear in Figure 2.

Now that you have a file and know what the structure is, let's determine what to do with the data when you enter DFCalc. The records in Inventory will be used to keep a file of valuables for insurance purposes. Besides the actual records in Inventory, it might be useful to determine the replacement cost of each item. This would require adjusting the original cost by the age of the item and the yearly inflation rate, thus introducing two additional data fields, each containing a formula.

Report Layout

Figure 3 suggests the layout of the report, which is 67 printout columns wide. Regarding the fields as "columns," they are numbered 1 through 8. The field descriptions, or column headers, are below the column numbers, and the bottom line, labeled "position," gives the printout column in which each report column begins. There are two spaces between columns. If your record field data is longer than the width of a column, the data will be truncated, starting at the right.

Once you've positioned the columns, you must determine what contents and operations will be part of each column. Figure 4 shows the structure of each column. I've explained the criteria above.

Contents of Columns

In the example, INVENTORY, the record's number is printed in the first column, using #. Columns 2 through 6 will contain whatever is found in the respective fields for that record number, indicated by F1 through F5.

Columns 7 and 8 are defined to have formulas, or equations, denoted by E. Column 7's equation involves subtracting the value found in column 6 (F5, the year of purchase) from the constant 86 (the current year). This results in the age of the item. Column 6 (C6) could be used in place of F5 as notation in the equation, since that column contains the field data. The formula would then be 86 – C6.

Column 8's equation uses the maximum number of operators allowed within one column, three, to derive the replacement value. The original cost (F4) is multiplied by .05 (the yearly inflation factor), and this result is multiplied in turn by the age of the item as calculated in C7. Finally, this result is added to the original cost (F4).

Column 8's formula could also have been written ((C5*.05)*C7)+C5. Since there were no calculations performed in column 5 (C5), the col-

Figure 1.

```
STRUCTURE OF DATAFILE ** INVENTORY **
#     RECORDS POSSIBLE IN FILE ...253
#     RECORDS IN CURRENT FILE .....5
#     FIELDS IN EACH RECORD: .......6

#     TITLES OF FIELDS          LENGTH
1     ITEM ..........................20
2     DESC ..........................20
3     SER# ..........................20
4     COST ..........................  9
5     YEAR ..........................  2
6     ROOM ..........................10
```

Figure 2.

REC#	ITEM	DESC	SER#	COST	YEAR	ROOM
1	COMPUTER	COMMODORE.C64	S00011142	595.00	83	DEN
2	TV	SONY	HA778800	365.50	72	FAMILY
3	TAPE.DECK	SHARP	LG324M01	129.95	77	FAMILY
4	MICROWAVE	GENERAL.ELEC	444TT6789	435.00	84	KITCHEN
5	CAT	CRUISER	>	>	81	

umn and the field have the same value.

Totals and Averages

Still referring to Figure 4, the End of Column (EOC) operation must be defined with one of the following three options:

N—*No operation (NOOP)*—do nothing with the column.

T—*Total*—find the sum of the contents of the column.

A—*Average*—find the average of the contents of the column (average = total ÷ number of records).

Since columns 1–4 and 6 are just displaying field data, we choose no end-of-column operations, using N. Column 5 contains the original cost, so we choose T to obtain the total of the original cost of all the items. Column 7 calculates the age of all the items, so it might be interesting to see the *average* age of all our goods by entering A for that column. We choose T for column 8 simply because we'd like to know how much to ask the insurance company for (or at least to realize how much new things cost nowadays).

Justification of Contents

You must choose how the field data, record number and calculated result will be printed within the column. Your choices are detailed in Figure 5.

Choosing either decimals or percent results in a prompt for the number of decimal places you want to the right of the decimal point. Any number from 0 through 8 is valid. If you think a calculation might result in answers being printed in scientific notation, choose either left or right justification. If text data is formatted with a numerical format, the value of that column will be zero.

In our Inventory example, we chose left justification for text data, right for numeric and currency for the two columns of costs.

Running DFCalc

Now that we have a game plan (the game gets easier the more we play), let's load DFCalc. As I mentioned earlier, you can load it from Datafile by pressing P at the main menu, and then C at the following menu, or, from Basic, by typing LOAD "DFCALC",8 <return>, and then RUN <return>.

The first display you'll see relates to configuring your printer, which I discussed earlier. The display looks like this:

```
CALCULATED REPORTS PROGRAM

USE OLD PREDEFINED FORMAT
  OR NEW FORMAT
    $ DISK DIRECTORY
    QUIT PROGRAM
TRANSFER TO:
    DATAFILE
    DFPRINT

PRESS THE APPROPRIATE KEY
```

Pressing Q terminates the program and $ displays the directory of the disk currently in the drive. Pressing O brings up the operations menu, in case a calculated report format has already been designed. Pressing N accesses the define report routines for entering all the requirements for printing the sample file Inventory. Press D. When the screen displays the following prompt, enter INVENTORY as shown, then press the return key.

```
INSERT DISK WITH THE DATAFILE
  TO BE USED FOR CALCULATED
  REPORTS.
ENTER THE NAME OF THE
  DATAFILE:
? INVENTORY
```

The program will look at the record file named Inventory and retrieve some important file-structure data that will be useful later on. The screen will then display the following sequences as you enter the data as shown:

```
DEFINE REPORT HEADER FORMAT

ENTER WIDTH OF REPORT (136 MAX)
? 70

ENTER NUMBER OF TITLE LINES IN
  THE REPORT HEADER (4 LINES MAX)
? 2

TITLE #1
? HOUSEHOLD INVENTORY

TITLE #2
? MAY 31 1985

PRESS CONT REDO START JUMP EXIT
```

After you press the return key following the second title, the mini-menu PRESS C R S J E will appear. You'll see this menu often throughout the defining sequence. It lets you change your mind as often as it appears. Here's a description of what each choice does.

Figure 3.

COLUMN	1	2	3	4	5	6	7	8
HEADERS	REC#	ITEM	DESCRIP	SERIAL#	COST	YEAR	AGE	REPCOST
POSITION	1	5	16	29	43	52	56	61

Figure 4.

COLUMN	CONTENTS	EQUATION	EOC	JUSTIFY
1	#		N	R
2	F1		N	L
3	F2		N	L
4	F3		N	L
5	F4		T	C
6	F5		N	L
7	E	86–F5	A	R
8	E	((F4*.05)*C7) + F4	T	C

Figure 5.

		NUMBERS	TEXT
L	— LEFT justify	(123)	(ABC)
R	— RIGHT justify	(123)	(ABC)
C	— CURRENCY, 2 places	(123.00)	(.00)
D4	— DECIMALS, 0–8 places	(123.0000)	(.0000)
P1	— PERCENT, RES*100	(12300.0)	(.0)

C—*Continue* on to the next step. (You're satisfied with what you've done so far.) Actually, pressing any key, including return, will advance you to the next step. You'll find this useful when you're plowing back through the format.

R—*Redo* the last step. This lets you change the very last step or column. DFCalc won't allow you to go backwards more than one step or to the start of a column.

S—*Start* over. Pressing S will send you back to the screen shown above, where you started defining the format. Don't fret! You won't have to retype everything. All your entries will be preprinted on the screen for you. If you don't want to make a change, just press return to accept the value shown. Keep pressing the return key to walk back through the sequence until you get to where you left off.

J—*Jump* to the end of the definition sequence. Pressing J will send you to the operations menu, bypassing all further entry or updating of the format definition. J assumes you've already been completely through the sequence or have loaded a previously defined format.

E—*Exit* the routine to the beginning of the program. This totally bails you out from the definitions sequence, back to where you first started the program. You might use this key if you discover you're working with the wrong record file or just want to quit.

Now, press return or any other key to continue. You'll get this display:

```
DEFINE REPORT COLUMNAR FORMAT

CALCULATE THE TOTAL LENGTH OF
  ALL FIELDS TO BE INCLUDED IN
  THE REPORT ALLOWING 2 SPACES
  BETWEEN EACH COLUMN.

ENTER THE NUMBER OF COLUMNS
  IN REPORT. (16 COLUMNS MAX).
? 8

FIELD NAME      DATA FOR: INVENTORY
(LENGTH)
1 ITEM 20       4 COST 9
2 DESC 20       5 YEAR 2
3 SER# 20       6 ROOM 10
```

Before you enter 8 for the number of columns, notice the bottom of the screen. The number, name and length of the fields in the record file Inventory are displayed, so you don't have to remember! This is why you had to enter the name of the record file before starting. From now on, at least until you complete your format definition, the datafile references will stay on the screen.

Important Notes!

1) Don't use your cursor controls during these processes. DFCalc and *all* the Datafile programs use input statements for entering data. Consequently, if you use your up/down cursor, the screen editor won't know where it is. To be safe, use DEL to backspace.

2) Don't use commas, semicolons, colons or quotation marks within any input prompt, or you'll probably lose some of your data or accidentally leave the program.

Pressing the return key brings up the mini-menu (CRSJE), then pressing return again will display a prompt for the position of column 1. Enter, as you are prompted, the individual column positions: 1, 5, 16, 29, 43, 52, 56 and 61. You'll notice the column number (in reversed print) incrementing each time you press return.

The next screen asks for the heading of column 1. Enter the headings as shown on the example, pressing return each time. The screen displays the column currently being worked on, as well as the width of that column. Any header you type in that's

Table 1. *Rules for legal operands.*

Operands are variables (data) being operated on by operators, such as *, /, +, −, sqr and int. Operands are denoted in the List of Legal Operators (see Table 2) as X and Y. The value created by a calculation is called the resultant. To help clarify and define these terms, I'll use the following simple equations as examples:

A = B*C Z = X + Y RES = .SINX RES = X↑Y RES = RES/200

In these equations, anything to the *left* of the equals sign is the *resultant* of the equation. The variables A, Z and RES are, therefore, resultants. In all the equations that you'll define using DFCalc, RES will be your resultant.

The items to the *right* of the equals sign will always consist of two operands and one operator, the middle term being the operator. B, C, X, Y, RES, 200 and the period are all operands. *, +, SIN, ↑ and / are all operators. The following is an expanded and more detailed description of what you can use as legal operands:

Record fields. An equation using record fields (F1, F4, F12, etc.) can take any of the following forms: RES =

F2*F3; F4↑F2; F4↑3; 100*F5; C3 + F3; .ABSF1; .SINF4; RES*F2; F4 + F5

The following conditions apply:

1) The number of the field defined must exist in the record file being printed.

2) The same field may be used more than once in any one column or in a number of column equations in either operand position.

3) Fields may be used in an equation with any operator except the sum through (+ +) operator.

4) The field referenced must contain numeric data. Alpha (non-numeric) characters such as A through Z, $, %, etc., in the data will produce a result of 0, an unreliable result, or an error condition when used in a calculation. If the equation cannot be resolved, "??error??" will be printed as a result or the program may crash.

Columns. An equation using columns may take the same kinds of forms as those involving fields, subject to the following condition: The column number referenced must be less than the number of the column containing the equation. If, for example, you're defining an equation for column C6, you can't use C6, C7, C15, etc., as operands.

Constants. Constants used in an equation may occupy either operand position and may have a positive or negative value, but must be within a range operable for the computer. Pi (3.14159265. . . .) is the only predefined constant.

Other operands. The period is used as the first operand when there is only one operand being operated on. This is usually the case when a higher level operator (identified by a three-letter code) is being used. For example: .SIN 30; .INV F1; .DEG 45; .SQR 4; and so on.

RES. The resultant (RES) of a previous calculation within the current column must be used as an operand if more than one operator is used. Up to three operators or equations may be used to complete a calculation within a column. The first operator may use any two legal operands, but the second and third operators *must* have RES as one of the operands in either position.

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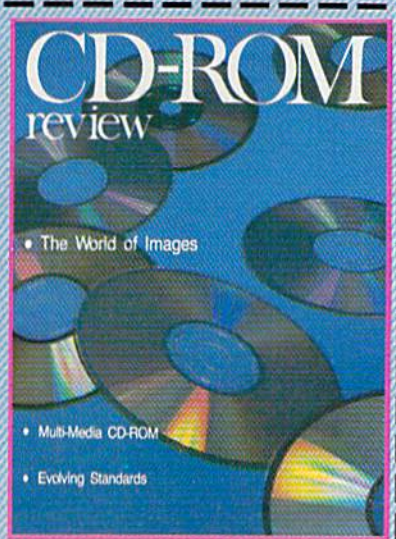

longer than the number of characters shown will be truncated. The column headers, you recall, are: 1)#; 2)ITEM; 3)DESCRIPTION; 4)SERIAL #; 5)ORGCOST; 6)YR; 7)AGE and 8)REPCOST.

At this point we'll begin to define the individual columns as to content, justification and end-of-column operations. Continuing with the next screen:

```
FORMAT INPUT ROUTINES FOR
  COLUMN 1

ENTER CONTENTS OF COLUMN 1

CHOOSE FIELD DATA
    EQUATION
    RUNNING TOTAL
    # RECORD NUMBER

    ? #
```

F will always be preprinted on the input until the fields have been defined. Remember, we want to use the record number for column 1, so press #. You'll then see this screen:

```
SET COLUMN 1 JUSTIFICATION

OPTIONS: LEFT
         RIGHT
         CURRENCY ($.00)
         PERCENT (%)
         DECIMALS TO RIGHT
? R
```

L is the default prompt. Enter R for right justification. Now, we've just completed the definition of column 1. In case you were wondering, the End of Column screen was bypassed, because the column contained only the record number, not any important data. From now on, you'll see the additional menu, and more. The next three screens reveal:

```
FORMAT INPUT ROUTINES FOR
  COLUMN 2

ENTER CONTENTS OF COLUMN 2
CHOOSE F E # Note: simplified menu
? F

WHICH FIELD # WILL BE IN
  COLUMN 2
ENTER 1 THROUGH 6
? 1


SET END-OF-COLUMN 2 OPERATION
OPTIONS: TOTAL SUM OF COLUMN
         AVERAGE CONTENTS OF
           COLUMN
         NO OPERATION
           TO COLUMN
? N
```

Table 2. *List of legal operators.*

Op	Func	Description of Operation
+ +	CX + + CY	SUM the columns X through Y.
+	X + Y	ADD the values X and Y.
−	X − Y	SUBTRACT the value Y from X.
*	X*Y	MULTIPLY the values X and Y.
/	X/Y	DIVIDE the value X by Y.
↑	X↑Y	Raise the value X to the POWER indicated by the EXPONENT Y. Y may be positive, negative or fractional.
SGN	.SGNX	Changes the SIGN of X from + to − or − to +.
SQR	.SQRX	Returns the SQUARE ROOT of X.
INV	.INVX	Returns the RECIPROCAL of X (1/X).
ABS	.ABSX	Returns the ABSOLUTE VALUE of X.
INT	.INTX	Makes a fractional X into an INTEGER.
LOG	.LOGX	Returns the NATURAL (base e) LOG of X. To convert to log base 10, divide by .log10.
EXP	.EXPX	Returns the value of the mathematical constant e (2.71828....) raised to the power of X.
SIN	.SINX	Returns the SINE of X, where X is measured in RADIANS.
COS	.COSX	Returns the COSINE of X.
TAN	.TANX	Returns the TANGENT of X.
SEC	.SECX	Returns the SECANT (1/COS) of X.
CSC	.CSCX	Returns the COSECANT (1/SIN) of X.
COT	.COTX	Returns the COTANGENT (1/TAN) of X.
ATN	.ATNX	Returns the ARCTANGENT (inverse tangent), or angle, in radians, whose tangent is X.
ACO	.ACOX	Returns the ARCCOSINE (inverse cosine), or angle, in radians, whose cosine is X.
ASN	.ASNX	Returns the ARCSINE (inverse sine), or angle, in radians, whose sine is X.
ASC	.ASCX	Returns the ARCSECANT (inverse secant) of X.
ACS	.ACSX	Returns the ARCCOSECANT (inverse cosecant) of X.
ACT	.ACTX	Returns the ARCCOTANGENT (inverse cotangent) of X.
RAD	.RADX	Converts the angle X from degree measure to RADIAN measure.
DEG	.DEGX	Converts the angle X from radian to DEGREE measure.
MMS	.MMSX	Converts the distance X from inches to MILLIMETERS.
INS	.INSX	Converts the distance X from millimeters to INCHES.
KMS	.KMSX	Converts the distance X from miles to KILOMETERS.
MLS	.MLSX	Converts the distance X from kilometers to MILES.
DFR	.DFRX	Converts the temperature X from degrees centigrade (Celsius) to degrees FAHRENHEIT.
DCG	.DCGX	Converts the temperature X from degrees Fahrenheit to degrees CENTIGRADE (Celsius).
GMS	.GMSX	Converts the weight X from ounces to GRAMS.
OZS	.OZSX	Converts the weight X from grams to OUNCES.
KGM	.KGMX	Converts the mass X from pounds to KILOGRAMS.
LBM	.LBMX	Converts the mass X from kilograms to POUNDS.
NWF	.NWFX	Converts the force X, in foot-pounds, to NEWTONS.
LBF	.LBFX	Converts the force, in newtons, to FOOT-POUNDS.
MPS	.MPSX	Converts the velocity X from feet per second to METERS PER SECOND.
FPS	.FPSX	Converts the velocity X from meters per second to FEET PER SECOND.
NSM	.NSMX	Converts the pressure X from pounds per square inch to NEWTONS PER SQUARE METER.
PSI	.PSIX	Converts the pressure X from newtons per square meter to POUNDS PER SQUARE INCH.
=	X = Y	If X equals Y then True (res = 1), else False (res = 0).
<	X < Y	If X is less than Y then True.
>	X > Y	If X is greater than Y then True.
<>	X < > Y	If X is not equal to Y then True.
or	XorY	If either X or Y is True (greater than 0) then True.
and	XandY	If both X and Y are True (greater than 0) then True.

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Circle 146 on Reader Service card.

```
SET COLUMN 2 JUSTIFICATION
OPTIONS: L R C P D
? L
```

That completes column 2! Complete the same sequence for columns 3, 4, 5 and 6, according to our previous layout, changing the justification and EOC as necessary. Stop when you get to column 7.

Now we'll define the formulas, or equations, for columns 7 and 8. The following display should be on your screen:

```
FORMAT INPUT ROUTINES FOR
  COLUMN 7

ENTER CONTENTS FOR COLUMN 7

CHOOSE F E R #
? E
```

After you enter E for equation, a new screen will appear with prompts for the equation:

```
ENTER EQUATION 1 FOR COLUMN 7

RES =

OPERAND X? .
OPERATOR ? .
OPERAND Y? .
```

Note that you're prompted for equation 1. You can define up to three operations in one column. Enter the operands and operator for the equation we defined earlier for this column: 85 – F5.

Press the return key after each entry shown on the following screen. The completed equation will be shown in the conventional form, followed by the mini-menu. Press return once more to get past the prompt:

```
ENTER EQUATION 1 FOR COLUMN 7

RES =

OPERAND X? 85
OPERATOR ? –
OPERAND Y? F5

RES = 85 – F5

PRESS C R S J E

EXPAND EQUATION? Y OR N
? N
```

Since the calculation in column 7 is sufficient, we won't expand on the equation. Enter N as shown and press return. We finish defining this column by continuing through the End of Column and Justification screens. A reminder: column 7's EOC is A and justification is R.

We are now at the beginning of column 8, which will contain the equation ((F4*.05)*C7) + F4. Keep in mind that we must start at the innermost set of parentheses and work out. The entire sequence of screens for column 8 follows. (Yours should grow similarly as you keep entering data and pressing return.)

```
FORMAT INPUT ROUTINES FOR
  COLUMN 8

ENTER CONTENTS OF COLUMN 8

CHOOSE F E R #
? E

ENTER EQUATION 1 FOR COLUMN 8

RES =

OPERAND X? F4
OPERATOR ? *
OPERAND Y? .05

RES = F4*.05

PRESS C R S J E

EXPAND EQUATION? Y OR N
? Y

ENTER EQUATION 2 FOR COLUMN 8

RES = F4*.05

OPERAND X? RES
OPERATOR ? *
OPERAND Y? C7

RES = F4*.05*C7

PRESS C R S J E

EXPAND EQUATION? Y OR N
? Y

ENTER EQUATION 3 FOR COLUMN 8

RES = (F4*.05)*C7

OPERAND X? RES
OPERATOR ? +
OPERAND Y? F4

RES = ((F4*.05)*C7) + F4

PRESS C R S J E

SET END-OF-COLUMN 8 OPERATION

OPTIONS: T A N
? T

SET COLUMN 8 JUSTIFICATION

OPTIONS: L R C P D
? C

PRESS C R S J E
```

When you've finished defining col-

Table 3. *Causes of error.*

When DFCalc is performing calculations, it will try to catch as many mathematical errors as possible. Some errors caused by calculations may force the computer to crash, while others may just produce inaccurate results. Syntactical errors (which cause the premature termination of the program) have, to the best of my knowledge, been accounted for.

The following produce an error condition, resulting in a value of 0 for the particular row/column cell, or an ??error?? flag.

1) Dividing by zero: X/0.
2) Taking the square root (or any even root) of a negative number: sqr(–X).
3) Taking the CSC or COT of zero: cot(0).
4) Taking the natural log of a number less than or equal to zero.
5) Raising the mathematical constant e to a power greater than 87: exp(87).
6) Using an invalid or illegal operator or operand.
7) Using an operator in an equation where an operand should be (and vice versa).
8) Using a numerical constant outside the range of the computer.
   a) Integers (whole numbers without decimal places) must be within the range of –32768 to +32767.
   b) Floating-point numbers, in scientific notation, must be within the range of +2.93873588e–39 to +1.70141183e+38.

Note: A calculation that tries to produce a result outside the legal range of the computer will result in an Overflow error and will definitely crash the program. There's no simple way to test for this, so stay away from galactic calculations. Since DFCalc uses a buffer for each column to keep track of column totals and values for calculations within a row, it's possible that your field data may inadvertently cause an Overflow error.

To help prevent what is intended to be printed as text from being interpreted as a number, you should precede suspect record-field items with an alpha character, such as # or P. This will always return a value of 0, since numbers after alpha characters are ignored.

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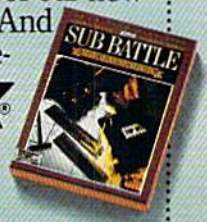

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Circle 12 on Reader Service card.

umn 8, you've completed the entire calculated-report format.

Operations Menu

The last return you pressed presented this screen:

```
CALCULATED REPORTS
OPERATIONS MENU

CURRENT DATAFILE: INVENTORY

  SAVE REPORT FORMAT
  LOAD REPORT FORMAT
  CHANGE REPORT FORMAT
  PRINT RECORDS
  RECONFIGURE PRINTER
  $ DISK DIRECTORY
  EXIT THIS DATAFILE

PRESS THE APPROPRIATE KEY
```

Pressing $ displays the directory of the current disk in the disk drive, E exits and closes the file you've been working with and sends you back to the beginning, and C sends you to the start of the format-definition routines so you can change one or all of your entries.

You can jump back to this menu, once you've made your corrections, by pressing J at one of the many mini-menu prompts. R sends you to the printer or interface configuration menu, where you can send printer CHR$ commands, and S saves the current calculated-report format to the disk.

Warning! Any calculated-report format file (shown on the disk as CR] INV...) of the same name will be scratched and replaced with the current format. If you've made changes to a format you want to keep, and also wish to retain the original, give the revised format a new name.

Make sure you save your current format before using E or L. However, you'll be given a second chance if you happen to forget.

L loads a format file from the disk into the computer's memory. This overwrites the format currently held in memory.

The Final Product

Let's assume you pressed A, for all records, at the print-options menu. The computer will print the title and heading of the report. Then it will start at the beginning of the sequential file and commence reading the records. After every record, the equations for each column will be calculated and the results printed in the current row on the report. Then the next record will be read, and so forth. When all the records have been read, the end-of-column information will be processed and printed. Finally, at the bottom of the report, the name of the record file will be printed, along with the number of records reported. Ⓡ

Address all author correspondence to Mike Konshak, 4821 Harvest Court, Colorado Springs, CO 80917.

Listing 1. *DFCalc program.*

```
10 IFFL=0THENFL=1:LOAD"DP] DOS5.
   1",8,1                    :REM*150
11 IFFL=1THENFL=2:SYS52224:REM (
   C) BY COMMODORE           :REM*83
600 FORE=0TO24:POKE54272+E,0:NEX
    T:POKE54296,15:GOTO3000
                             :REM*124
602 POKE54277,58:POKE54278,16:PO
    KE54273,35:POKE54272,134
                             :REM*246
604 POKE54276,33:FORE=1TO100:NEX
    T:POKE54276,16:RETURN
                             :REM*110
3000 REM DFCALC 1.5A PROGRAM FOR
     DATAFILE BY MIKE KONSHAK (
    C)1986                   :REM*155
3004 POKE53281,0:POKE53280,0:PRI
    NT"{CTRL 8}":OPEN4,4:OPEN3,
    3:GOSUB4000              :REM*65
3006 REM----DIM ARRAYS       :REM*33
3008 B$=CHR$(32):PI=3.14159265:C
    R$=CHR$(13)              :REM*253
3010 FORI=1TO100:S$=S$+CHR$(32):
    NEXTI                    :REM*153
3012 DIM F$(31),T%(31),L%(31),RE
    C$(31),SUM(17),BUF(17)
                             :REM*147
3014 DIM F(17),C$(17,15),PC(18),
    TT$(5),HC$(17):GOTO3044
                             :REM*161
3016 REM----GET              :REM*209
3018 GETA$:IFA$=""THEN3018
                             :REM*81
3020 RETURN                  :REM*17
3022 REM----PROMPT           :REM*91
3024 PRINT"{COMD 6}{CRSR DN} PRE
    SS {CTRL 9}{CTRL 2}C{COMD 6
    }{CTRL 0}ONT {CTRL 9}{CTRL
    2}R{COMD 6}{CTRL 0}EDO {CTR
    L 9}{CTRL 2}S{COMD 6}{CTRL
    0}TART {CTRL 9}{CTRL 2}J{CO
    MD 6}{CTRL 0}UMP {CTRL 9}{C
    TRL 2}E{COMD 6}{CTRL 0}XIT{
    CTRL 8}"                 :REM*95
3026 GOSUB3018:RETURN        :REM*145
3028 REM----CLEAR TOP 13 ROWS OF
     SCREEN                  :REM*111
3030 FORZ=1TO13:POKE781,Z:SYS599
    03:NEXTZ:RETURN          :REM*157
3032 REM----DISK ERROR       :REM*39
3034 INPUT#15,EN,EM$,ET,ES:IF(EN
    <20)OR(EN=62)THENET=0:RETUR
    N                        :REM*139
3036 PRINT"{CRSR DN} {CTRL 9}{CO
    MD 3}DISK ERROR{CTRL 0}"EN"
    {CRSR LF}, "EM$","ET"{CRSR
    LF},"ES"{CTRL 8}":ET=8
                             :REM*181
3038 PRINT"{CRSR DN} {COMD 6}PRE
    SS {CTRL 9}{CTRL 2}ANY KEY{
    COMD 6}{CTRL 0} TO CONTINUE
    {CTRL 8}"                :REM*113
3040 GOSUB3018:CLOSE5:CLOSE15:RE
    TURN                     :REM*153
3042 REM----STARTING MENU
                             :REM*211
3044 PRINT"{CTRL 8}{SHFT CLR} {C
    TRL 9}{2 SPACEs}CALCULATED
    REPORTS PROGRAM REV 1.5A "
                             :REM*175
3045 PRINT" {CTRL 8}{CTRL 9}{2 S
    PACEs}COPYRIGHT (C)1986 BY
    MIKE KONSHAK{3 SPACEs}"
                             :REM*208
3046 PRINT"{2 CRSR DNs}{COMD 6}{
    3 SPACEs}USE{2 SPACEs}{CTRL
     9}{CTRL 2}O{COMD 6}{CTRL 0
    }LD PREDEFINED FORMAT"
                             :REM*71
3047 PRINT"{CRSR DN}{4 SPACEs}OR
    {2 SPACEs}{CTRL 9}{CTRL 2}N
    {COMD 6}{CTRL 0}EW FORMAT"
                             :REM*220
3048 PRINT"{CRSR DN}{8 SPACEs}{C
    TRL 9}{CTRL 2}${COMD 6}{CTR
    L 0} DISK DIRECTORY {CTRL 9
    }{CTRL 2}4{COMD 6}{CTRL 0}"
                             :REM*147
3049 PRINT"{CRSR DN}{8 SPACEs}{C
    TRL 9}{CTRL 2}Q{COMD 6}{CTR
    L 0}UIT PROGRAM"         :REM*220
3050 PRINT"{CRSR DN} TRANSFER TO
    :"                       :REM*61
3051 PRINT"{CRSR DN}{8 SPACEs}{C
    TRL 9}{CTRL 2}D{COMD 6}{CTR
    L 0} DATAFILE DBMS"      :REM*64
3052 PRINT"{CRSR DN}{8 SPACEs}{C
    TRL 9}{CTRL 2}P{COMD 6}{CTR
    L 0} DFPRINT REPORTS-LISTS-
    LABELS"                  :REM*9
3054 PRINT"{CRSR DN} {CTRL 8}{CT
    RL 9}{6 SPACEs}PRESS THE AP
    PROPRIATE KEY{7 SPACEs}{CTR
    L 0}"                    :REM*155
3056 GOSUB3018:IFA$="Q"THENCLOSE
    3:CLOSE4:PRINT"{SHFT CLR}":
    END                      :REM*185
3058 IFA$="N"THENK=1:GOTO3068
                             :REM*135
3059 IFA$="D"THENPRINT"{SHFT CLR
    }{CTRL 1}LOAD"CHR$(34)"DATA
    FILE"CHR$(34)",8":GOTO3064
                             :REM*124
3060 IFA$="O"THENK=2:FL=0:GOTO30
    68                       :REM*131
3061 IFA$="P"THENPRINT"{SHFT CLR
    }{CTRL 1}LOAD"CHR$(34)"DFPR
    INT"CHR$(34)",8":GOTO3064
                             :REM*102
3062 IFA$="$"ORA$="4"THENGOSUB39
    40:GOTO3044              :REM*163
3063 GOSUB6002:GOTO3056      :REM*160
3064 PRINT:PRINT:PRINT:PRINT:PRI
    NT"RUN{CTRL 8}"          :REM*253
3065 POKE631,19:POKE632,13:POKE6
    33,13:POKE634,13:POKE635,13
    :POKE636,13              :REM*186
3066 POKE198,6:NEW:END       :REM*29
3067 REM----OPEN DATAFILE, READ
    FILE STRUCTURE           :REM*86
3068 PRINT"{COMD 6}{SHFT CLR} AV
    AILABLE DATAFILE RECORD FIL
    ES ARE:{CTRL 8}{CRSR DN}":@
    "$0:DF]*"                :REM*5
3072 PRINT"{COMD 6} NAME OF DATA
    FILE RECORD FILE?{CTRL 8}"
                             :REM*28
3074 PRINT" ? "NF$:INPUT"{CRSR U
    P} ";A$:IFA$=""THEN3044
                             :REM*44
3076 IFA$=NF$THEN3096        :REM*180
3078 NF$=A$                  :REM*120
3080 OPEN15,8,15:OPEN5,8,5,"0:DF
    ] "+NF$+",S,R":GOSUB3034:IF
```

Continued on p. 66.

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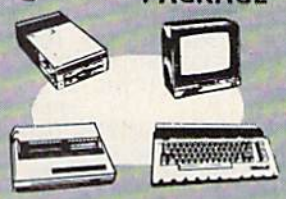
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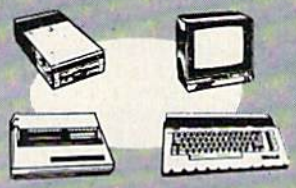
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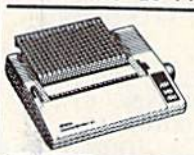
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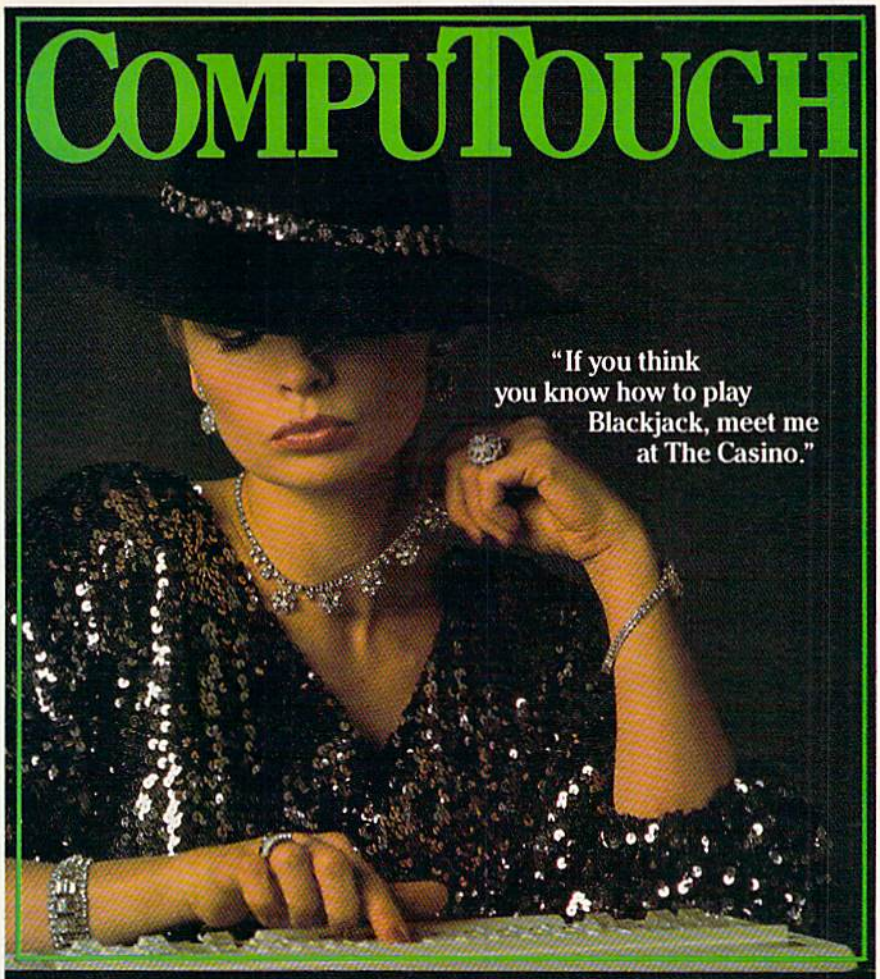
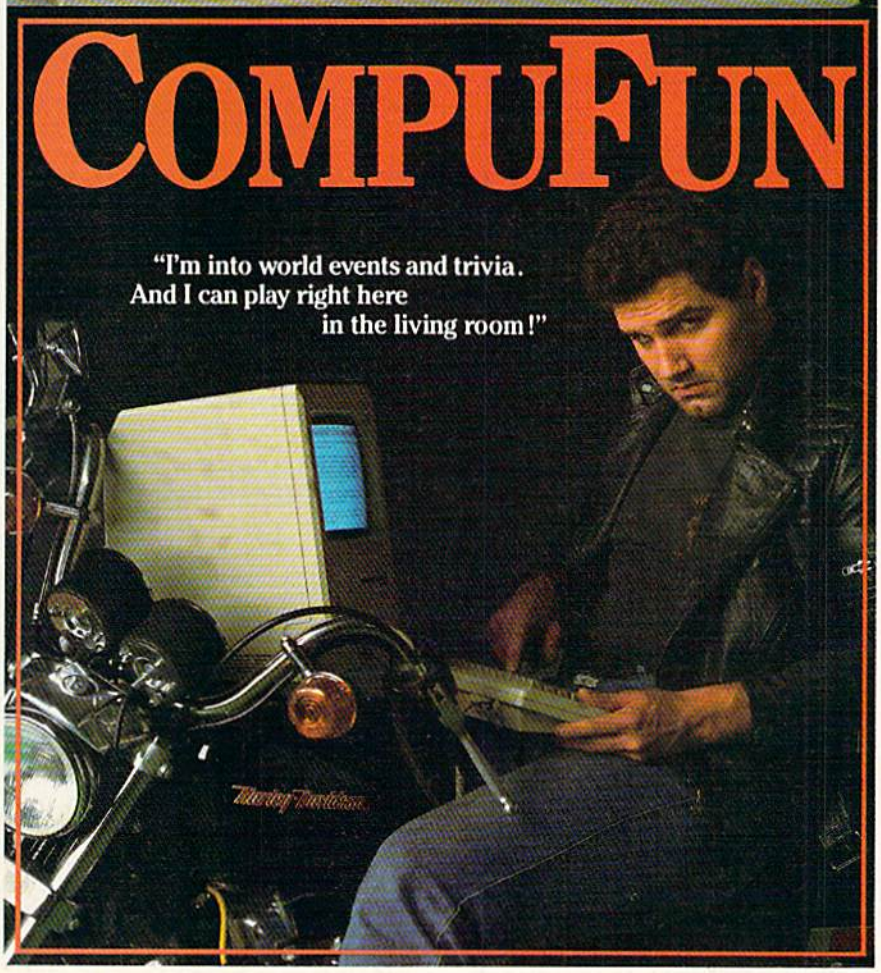
From p. 62.

```
ET=8THEN3Ø44          :REM*228
3Ø82 IFEN=62THENGOSUB3Ø36:GOTO3Ø
44                    :REM*18Ø
3Ø84 INPUT#5,R,F,X:GOSUB3Ø34:IFE
T=8THEN3Ø44           :REM*138
3Ø88 FORN=1TOF:INPUT#5,F$(N),L%(
N):NEXTN:GOSUB3Ø34:IFET=8TH
EN3Ø44                :REM*22
3Ø9Ø CLOSE5:CLOSE15    :REM*232
3Ø92 IFK=2THEN3386     :REM*26
3Ø94 REM----DEFINE NEW FORMAT
                      :REM*1Ø8
3Ø96 CK=1:PRINT"{CTRL 8}{SHFT CL
R} {CTRL 9}{4 SPACEs}DEFINE
 REPORT HEADER FORMAT{4 SPA
CEs}{CTRL Ø}"         :REM*58
3Ø98 PRINT"{COMD 6}{CRSR DN} ENT
ER WIDTH OF REPORT (136 MAX
)"                    :REM*48
31ØØ PRINT"{CTRL 8} ? Ø{2 CRSR L
Fs}"PW:INPUT"{CRSR UP} ";PW
:IFPW>136THENPRINT"{7 CRSR
UPs}":GOTO3Ø98        :REM*246
31Ø2 PRINT"{COMD 6}{CRSR DN} ENT
ER NUMBER OF TITLE LINES IN
 THE"                 :REM*42
31Ø4 PRINT" REPORT HEADER (4 LIN
ES MAX)"              :REM*236
31Ø6 PRINT"{CTRL 8}{2 SPACEs}"NL
:INPUT"{CRSR UP} ";NL:IFNL>
4THENPRINT"{7 CRSR UPs}":GO
TO31Ø2                :REM*176
31Ø8 IFNL=ØTHENTT$(1)="{COMD 6}N
O TITLES":GOTO3118    :REM*18
311Ø PRINT:FORJ=1TONL:PRINT"{COM
D 6} {CTRL 9}TITLE #{CTRL 8
}"J:PRINT" ? >{CRSR LF}"TT$
(J)                   :REM*66
3112 IFLEN(TT$(J))>37THENPRINT"{
CRSR UP}";            :REM*1Ø8
3114 INPUT"{CRSR UP} ";TT$(J):IF
TT$(J)=""THENTT$(J)=">"
                      :REM*184
3116 NEXTJ            :REM*148
3118 GOSUB3Ø24:IFA$="E"THEN3Ø44
                      :REM*224
312Ø IFA$="J"THEN3386  :REM*22Ø
3122 IFA$="R"ORA$="S"THEN3Ø96
                      :REM*19Ø
3124 REM----PRINT FIELD INFO FOR
 REFERENCE            :REM*Ø
3126 PRINT"{SHFT CLR}":FORI=1TO(
22-INT(F/2)):PRINTCHR$(17);
:NEXTI                :REM*12Ø
3128 PRINT"{COMD 6} {CTRL 9}FIEL
D NAME(LENGTH) DATA FOR {CT
RL 8}"NF$             :REM*252
313Ø OE=1:IF(F/2)=INT(F/2)THENOE
=Ø:GOTO3132           :REM*232
3132 OF=INT(F/2):FORI=1TOOF+OE
                      :REM*36
3134 PRINT" {CTRL 2}{CTRL 9}"I"{
CTRL Ø}{COMD 6}"F$(I)L%(I);
                      :REM*5Ø
3136 IFOE=1THEN314Ø    :REM*166
3138 PRINTTAB(19)"{CTRL 9}{CTRL
2}"I+OF"{CTRL Ø}{COMD 6}"F$
(I+OF)L%(I+OF):GOTO3142
                      :REM*2Ø2
314Ø IFI+OF<FTHENPRINTTAB(19)"{C
TRL 2}{CTRL 9}"I+OF+1"{CTRL
 Ø}{COMD 6}"F$(I+OF+1)L%(I+
OF+1)                 :REM*24Ø
3142 NEXTI            :REM*166
3144 REM----ENTER COLUMNAR DATA
                      :REM*128
3146 PRINT"{HOME}{CTRL 8} {CTRL
9}{4 SPACEs}DEFINE REPORT C
OLUMNAR FORMAT{4 SPACEs}{CT
RL Ø}"                :REM*242
3148 GOSUB3Ø3Ø         :REM*158
315Ø PRINT"{COMD 6}{HOME}{2 CRSR
 DNs} CALCULATE THE TOTAL L
ENGTH OF ALL"         :REM*226
3152 PRINT" FIELDS TO BE INCLUDE
D IN THE REPORT."     :REM*56
3154 PRINT" ALLOWING 2 SPACES BE
TWEEN EACH"           :REM*26
3156 PRINT" COLUMN."   :REM*25Ø
3158 PRINT"{CRSR DN} ENTER THE N
UMBER OF COLUMNS IN REPORT.
"                     :REM*152
316Ø PRINT" (16 COLUMNS MAX)"
                      :REM*4Ø
3162 PRINT"{CTRL 8} ? Ø{2 CRSR L
Fs}"NC:INPUT"{CRSR UP} ";NC
:IFNC>16THEN3148      :REM*28
3164 GOSUB3Ø24:IFA$="E"THEN3Ø44
                      :REM*14
3166 IFA$="J"THEN3386  :REM*1Ø
3168 IFA$="R"THEN3148   :REM*2
317Ø IFA$="S"THEN3Ø96   :REM*138
3172 REM----COLUMN POSITION
                      :REM*8
3174 FORI=1TONC:GOSUB3Ø3Ø
                      :REM*1ØØ
3176 PRINT"{COMD 6}{HOME}{2 CRSR
 DNs} ENTER POSITION OF COL
UMN {CTRL 8}{CTRL 9}"I"{CRS
R DN}"                :REM*238
3178 PRINT" ? Ø{2 CRSR LFs}"PC(I
):INPUT"{CRSR UP} ";PC(I):I
FPC(I)=ØTHEN3174      :REM*82
318Ø IFPC(I)>PWTHENPRINT"{2 CRSR
 UPs}":GOTO3178       :REM*158
3182 NEXTI            :REM*2Ø6
3184 GOSUB3Ø24:IFA$="E"THEN3Ø44
                      :REM*34
3186 IFA$="J"THEN3386  :REM*3Ø
3188 IFA$="R"THEN3174  :REM*196
319Ø IFA$="S"THEN3Ø96   :REM*158
3192 FORI=1TONC:GOSUB3Ø3Ø
                      :REM*118
3194 REM----COLUMN HEADING
                      :REM*1Ø2
3196 PRINT"{COMD 6}{HOME}{2 CRSR
 DNs} ENTER HEADING OF COLU
MN {CTRL 8}{CTRL 9}"I
                      :REM*252
3198 PRINT"{COMD 6} HEADING IS {
CTRL 8}{CTRL 9}";:IFI=NCTHE
NPRINTPW-PC(I);:GOTO32Ø2
                      :REM*68
32ØØ PRINTPC(I+1)-2-PC(I);
                      :REM*74
32Ø2 PRINT"{CTRL Ø} {COMD 6}CHAR
ACTERS WIDE{CRSR DN}"
                      :REM*18
32Ø4 PRINT"{CTRL 8} ? >{CRSR LF}
"HC$(I):INPUT"{CRSR UP} ";H
C$(I):IFHC$(I)="R"THEN3192
                      :REM*23Ø
32Ø6 NEXTI            :REM*23Ø
32Ø8 GOSUB3Ø24:IFA$="E"THEN3Ø44
                      :REM*58
321Ø IFA$="J"THEN3386   :REM*54
3212 IFA$="R"THEN3192   :REM*188
3214 IFA$="S"THEN3Ø96   :REM*182
3216 REM----COLUMN CONTENTS DATA
                      :REM*2Ø6
3218 FORI=1TONC:PRINT"{HOME} {CT
RL 8}{CTRL 9} FORMAT INPUT
ROUTINES FOR COLUMN{CTRL 2}
"I                    :REM*82
322Ø GOSUB3Ø3Ø:PRINT"{COMD 6}{HO
ME}{2 CRSR DNs} ENTER CONTE
NTS OF COLUMN {CTRL 8}{CTRL
 9}"I                 :REM*44
3222 PRINT"{COMD 6}{CRSR DN} CHO
OSE {CTRL 9}{CTRL 2}F{COMD
6}{CTRL Ø}IELD DATA IN RECO
RDS"                  :REM*148
3224 PRINT"{8 SPACEs}{CTRL 9}{CT
RL 2}E{COMD 6}{CTRL Ø}QUATI
ON"                   :REM*3Ø
3225 PRINT"{8 SPACEs}{CTRL 9}{CT
RL 2}R{COMD 6}{CTRL Ø}UNNIN
G TOTAL (BALANCE)"    :REM*51
3226 PRINT"{8 SPACEs}{CTRL 9}{CT
RL 2}#{COMD 6}{CTRL Ø} RECO
RD NUMBER"            :REM*124
3228 PRINT"{CTRL 8} ? F{CRSR LF}
"LEFT$(C$(I,1),1):INPUT"{CR
SR UP} ";C$:C$(I,1)=C$+MID$
(C$(I,1),2)           :REM*46
323Ø IFC$="#"THENC$(I,1)="#":C$(
I,13)="N":GOTO3344    :REM*168
3232 IFC$="F"THEN3238   :REM*68
3234 IFC$="E"THEN326Ø   :REM*242
3235 IFC$="R"THEN3239   :REM*1Ø9
3236 PRINT"{2 CRSR UPs}":GOSUB6Ø
2:GOTO3228            :REM*196
3238 PRINT"{CRSR DN}{COMD 6} WHI
CH FIELD # WILL BE IN COLUM
N {CTRL 8}{CTRL 9}"I:GOTO32
41                    :REM*7Ø
3239 PRINT"{CRSR DN}{COMD 6} WHI
CH COLUMN # IS TO HAVE A RU
NNING"                :REM*1Ø9
324Ø PRINT" TOTAL IN COLUMN {CTR
L 9}{CTRL 8}"I"{CTRL Ø}{CRS
R LF}? {COMD 6}ENTER {CTRL
9}{CTRL 2}1{COMD 6}{CTRL Ø}
 THRU {CTRL 9}{CTRL 2}"I-1:
GOTO3245              :REM*3Ø
3241 PRINT"{COMD 6} ENTER {CTRL
9}{CTRL 2}1{COMD 6}{CTRL Ø}
 THRU {CTRL 2}{CTRL 9}"F
                      :REM*121
3242 PRINT"{CTRL 8} ? "MID$(C$(I
,1),2,2):INPUT"{CRSR UP} ";
C$                    :REM*21Ø
3243 IF(VAL(C$)>F)OR(VAL(C$)<=Ø)
THENPRINT"{2 CRSR UPs}":GOT
O3242                 :REM*139
3244 GOTO3247          :REM*24Ø
3245 PRINT"{CTRL 8} ? "MID$(C$(I
,1),2,2):INPUT"{CRSR UP} ";
C$                    :REM*213
3246 IF(VAL(C$)>I-1)OR(VAL(C$)<=
Ø)THENPRINT"{2 CRSR UPs}":G
OTO3245               :REM*158
3247 C$(I,1)=LEFT$(C$(I,1),1)+C$
                      :REM*213
3248 GOTO3328          :REM*4
325Ø GOSUB3Ø24:IFA$="E"THEN3Ø44
                      :REM*1ØØ
3252 IFA$="J"THEN3386   :REM*96
3254 IFA$="R"THEN322Ø   :REM*62
3256 IFA$="S"THEN3Ø96   :REM*224
3258 REM----COLUMN CONTENTS CALC
ULATION               :REM*4Ø
326Ø EQ=2:OP=1:FORJ=ØTO3:RS$(J)=
"":NEXTJ:GOTO3264     :REM*1Ø8
3262 EQ=EQ+4:OP=OP+1    :REM*2
3264 GOSUB3Ø3Ø:PRINT"{HOME}{2 CR
SR DNs}{COMD 6} ENTER EQUAT
ION {CTRL 8}{CTRL 9}"OP"{CO
MD 6}{CTRL Ø}FOR COLUMN {CT
RL 8}{CTRL 9}"I       :REM*198
3266 IFOP>1THENGOSUB33Ø8:REM*152
3268 PRINT"{CRSR DN} {CTRL 2}{CT
RL 9}RES{CTRL 8}{CTRL Ø}="R
S$(OP-1)              :REM*94
327Ø PRINT"{CRSR DN}{COMD 6} OPE
RAND X{CTRL 8}? .{CRSR LF}"
C$(I,EQ)              :REM*236
3272 PRINT"{COMD 6} OPERATOR {CT
RL 8}? .{CRSR LF}"C$(I,EQ+1
)                     :REM*54
3274 PRINT"{COMD 6} OPERAND Y{CT
RL 8}? .{CRSR LF}"C$(I,EQ+2
)                     :REM*128
3276 PRINT"{HOME}{6 CRSR DNs}"TA
```

```
    B(1Ø):INPUTC$(I,EQ):REM*11Ø
3278 PRINTTAB(1Ø):INPUTC$(I,EQ+1
    )                  :REM*13Ø
3280 PRINTTAB(1Ø):INPUTC$(I,EQ+2
    )                  :REM*134
3282 GOSUB33Ø8:PRINT"{CRSR DN} {
    CTRL 2}RES="RS$(OP)"{CTRL 8
    }":C$(I,14)=RS$(OP):REM*144
3284 GOSUB3Ø24:IFA$="E"THEN3Ø44
                       :REM*134
3286 IFA$="J"THEN3386   :REM*13Ø
3288 IFA$="R"THEN322Ø    :REM*96
3290 IFA$="S"THEN3Ø96     :REM*2
3292 IFEQ=1ØTHEN3328      :REM*Ø
3294 PRINT"{CRSR UP}{COMD 6} EXP
    AND EQUATION? {CTRL 9}{CTRL
     2}Y{COMD 6}{CTRL Ø} OR {CT
    RL 9}{CTRL 2}N{CTRL 8}{CTRL
     Ø}{13 SPACEs}"    :REM*168
3296 PRINT" ? N{CRSR LF}"C$(I,EQ
    +3):INPUT"{CRSR UP} ";C$(I,
    EQ+3)              :REM*36
3298 IFC$(I,EQ+3)="Y"THEN3262
                       :REM*168
3300 :                 :REM*216
3302 IFC$(I,EQ+3)="N"THENFORJ=EQ
    +4TO12:C$(I,J)=".":NEXTJ:GO
    TO3328             :REM*112
3304 PRINT"{2 CRSR UPs}":GOTO329
    4                  :REM*36
3306 REM----COMBINE OPERATIONS
                       :REM*24
3308 ONOPGOTO331Ø,3312,3318
                       :REM*78
3310 RS$(1)=C$(I,2)+C$(I,3)+C$(I
    ,4):GOTO3324       :REM*226
3312 IFC$(I,6)="RES"THEN3316
                       :REM*212
3314 RS$(2)=C$(I,6)+C$(I,7)+"("+
    RS$(1)+")":GOTO3324:REM*14Ø
3316 RS$(2)="("+RS$(1)+")"+C$(I,
    7)+C$(I,8):GOTO3324:REM*112
3318 IFC$(I,1Ø)="RES"THEN3322
                       :REM*112
3320 RS$(3)=C$(I,1Ø)+C$(I,11)+"(
    "+RS$(2)+")":GOTO3324
                       :REM*162
3322 RS$(3)="("+RS$(2)+")"+C$(I,
    11)+C$(I,12)       :REM*17Ø
3324 RETURN            :REM*66
3326 REM----FIELD TOTALS:REM*154
3328 GOSUB3Ø3Ø:PRINT"{HOME}{2 CR
    SR DNs}{COMD 6} SET END-OF-
    COLUMN OPERATION"  :REM*2Ø3
3330 PRINT"{CRSR DN} OPTIONS: {C
    TRL 9}{CTRL 2}T{COMD 6}{CTR
    L Ø}OTAL SUM OF COLUMN"
                       :REM*83
3332 PRINT"{1Ø SPACEs}{CTRL 9}{C
    TRL 2}A{COMD 6}{CTRL Ø}VERA
    GE CONTENTS OF COLUMN"
                       :REM*35
3334 PRINT"{1Ø SPACEs}{CTRL 9}{C
    TRL 2}N{COMD 6}{CTRL Ø}O OP
    ERATION TO COLUMN{CRSR DN}"
                       :REM*55
3336 PRINT"{CTRL 8} ? N{CRSR LF}
    "C$(I,13):INPUT"{CRSR UP} "
    ;C$(I,13)          :REM*243
3338 IF(C$(I,13)="T")OR(C$(I,13)
    ="A")OR(C$(I,13)="N")THEN33
    44                 :REM*139
3340 PRINT"{2 CRSR UPs}":GOTO333
    6                  :REM*61
3342 REM----SET JUSTIFICATIONS
                       :REM*93
3344 GOSUB3Ø3Ø:PRINT"{HOME}{CRSR
     DN}{COMD 6} SET COLUMN JUS
    TIFICATION         :REM*183
3346 PRINT"{CRSR DN} OPTIONS: {C
    TRL 9}{CTRL 2}L{COMD 6}{CTR
```

→





Circle 64 on Reader Service card.

Listing 1 continued.

```
L Ø}EFT"                :REM*171
3348 PRINT"{1Ø SPACEs}{CTRL 9}{C
     TRL 2}R{COMD 6}{CTRL Ø}IGHT
     "                  :REM*1Ø1
335Ø PRINT"{1Ø SPACEs}{CTRL 9}{C
     TRL 2}C{COMD 6}{CTRL Ø}URRE
     NCY ($.ØØ)"        :REM*79
3352 PRINT"{1Ø SPACEs}{CTRL 9}{C
     TRL 2}P{COMD 6}{CTRL Ø}ERCE
     NT (%)"            :REM*221
3354 PRINT"{1Ø SPACEs}{CTRL 9}{C
     TRL 2}D{COMD 6}{CTRL Ø}ECIM
     ALS TO RIGHT"      :REM*1Ø5
3356 PRINT"{CTRL 8} ? L{CRSR LF}
     "LEFT$(C$(I,Ø),1):INPUT"{CR
     SR UP} ";C$:C$(I,Ø)=C$+MID$
     (C$(I,Ø),2)        :REM*1Ø5
3358 IF(C$="L")OR(C$="R")OR(C$="
     C")THEN337Ø        :REM*63
336Ø IF(C$="P")OR(C$="D")THEN336
     4                  :REM*151
3362 PRINT"{2 CRSR UPs}":GOTO335
     6                  :REM*99
3364 PRINT"{COMD 6} # OF PLACES
     TO THE RIGHT OF DECIMAL:"
                        :REM*57
3366 PRINT"{CTRL 8} ? 1{CRSR LF}
     "MID$(C$(I,Ø),2,1):INPUT"{C
     RSR UP} ";C$       :REM*187
3368 C$(I,Ø)=LEFT$(C$(I,Ø),1)+C$
                        :REM*2Ø5
337Ø GOSUB3Ø24:IFA$="E"THEN3Ø44
                        :REM*221
3372 IFA$="J"THEN3386   :REM*217
3374 IFA$="R"THEN322Ø   :REM*183
3376 IFA$="S"THEN3Ø96   :REM*89
3378 FORJ=ØTO14:IFC$(I,J)=""THEN
     C$(I,J)="."        :REM*1
338Ø NEXTJ:NEXTI        :REM*227
3382 FL=1               :REM*17
3384 REM----OPERATIONS MENU
                        :REM*191
3386 PRINT"{SHFT CLR} {CTRL 8}{C
     TRL 9}{2 SPACEs}CALCULATED
     REPORTS OPERATIONS MENU{2 S
     PACEs}{CTRL Ø}"    :REM*195
3388 PRINT"{CRSR DN}{COMD 6}{4 S
     PACEs}CURRENT DATAFILE: {CT
     RL 9}{CTRL 8}"NF$  :REM*1Ø5
339Ø IFFL=1THENPRINT"{CRSR DN}{3
      SPACEs}{CTRL 9}{CTRL 2}S{C
     OMD 6}{CTRL Ø}AVE REPORT FO
     RMAT"              :REM*33
3392 PRINT"{CRSR DN}{3 SPACEs}{C
     TRL 9}{CTRL 2}L{COMD 6}{CTR
     L Ø}OAD REPORT FORMAT"
                        :REM*17
3394 IFFL=1THENPRINT"{CRSR DN}{3
      SPACEs}{CTRL 9}{CTRL 2}C{C
     OMD 6}{CTRL Ø}HANGE REPORT
     FORMAT"            :REM*237
3396 IFFL=1THENPRINT"{CRSR DN}{3
      SPACEs}{CTRL 9}{CTRL 2}P{C
     OMD 6}{CTRL Ø}RINT RECORDS"
                        :REM*247
3397 PRINT"{CRSR DN}{3 SPACEs}{C
     TRL 9}{CTRL 2}R{COMD 6}{CTR
     L Ø}ECONFIGURE PRINTER, OPT
     ION{CTRL 8}"P;:IFP=4THENPRI
     NT"{2 CRSR LFs}{CTRL 9}SCRE
     EN{CTRL Ø}";       :REM*98
3398 PRINT:PRINT"{CRSR DN}{3 SPA
     CEs}{CTRL 9}{CTRL 2}${COMD
     6}{CTRL Ø} DISK DIRECTORY {
     CTRL 9}{CTRL 2}4{CTRL Ø}"
                        :REM*1
34ØØ PRINT"{CRSR DN}{3 SPACEs}{C
     TRL 9}{CTRL 2}E{CTRL Ø}{COM
     D 6}XIT THIS DATAFILE"
                        :REM*49
3402 PRINT"{CRSR DN}{CTRL 8} {CT
     RL 9}{7 SPACEs}PRESS THE AP
     PROPRIATE KEY{6 SPACEs}{CTR
     L Ø}"              :REM*231
3404 GOSUB3Ø18:IFA$="E"ANDCK=ØTH
     EN3Ø44             :REM*61
3406 IFA$="S"THEN343Ø   :REM*119
3408 IFA$="L"THEN3456   :REM*213
341Ø IFA$="C"THEN3Ø96   :REM*115
3412 IFA$="P"THEN3496   :REM*27
3414 IFA$="$"ORA$="4"THENGOSUB39
     4Ø:GOTO3386        :REM*43
3416 IFA$="E"ANDCK=1THEN342Ø
                        :REM*119
3417 IFA$="R"THENGOSUB4ØØØ:GOTO3
     386                :REM*72
3418 GOSUB6Ø2:GOTO34Ø4  :REM*233
342Ø PRINT"{CRSR UP} {COMD 3}{CT
     RL 9}YOU HAVE NOT SAVED YOU
     R NEW FORMAT!!!{CTRL Ø}{CTR
     L 8}"              :REM*23
3422 PRINT" DO YOU STILL WANT TO
      EXIT? {CTRL 9}Y{CTRL Ø} OR
      {CTRL 9}N{CTRL Ø}?{3 SPACE
     s}"                :REM*51
3424 GOSUB3Ø18:IFA$="Y"THEN3Ø44
                        :REM*119
3426 GOTO3386           :REM*249
3428 REM----SAVE REPORT FORMAT
                        :REM*59
343Ø PRINT"{CRSR DN}{COMD 6} SAV
     E UNDER WHAT FILE NAME?"
                        :REM*57
3432 PRINT"{CRSR DN}{CTRL 8} ? "
     NF$:INPUT"{CRSR UP} ";CF$:I
     FCF$=""THEN3386    :REM*231
3434 PRINT"{CRSR DN} SAVING CALC
     ULATED REPORT FORMAT"
                        :REM*33
3436 OPEN15,8,15:PRINT#15,"S Ø:CR
     ] "+CF$:GOSUB3Ø34:IFET=8THE
     N3386              :REM*1Ø9
3438 OPEN5,8,5,"Ø:CR] "+CF$+",S,
     W":GOSUB3Ø34:IFET=8THEN3386
                        :REM*197
344Ø PRINT#5,PW;CR$;NL;CR$;NC:GO
     SUB3Ø34:IFET=8THEN3386
                        :REM*171
3442 FORJ=1TONL:PRINT#5,TT$(J):N
     EXTJ:GOSUB3Ø34:IFET=8THEN33
     86                 :REM*1Ø7
3444 FORI=1TONC:PRINT#5,PC(I);CR
     $;HC$(I):GOSUB3Ø34:IFET=8TH
     EN3386             :REM*181
3446 FORJ=ØTO14:PRINT#5,C$(I,J):
     NEXTJ:GOSUB3Ø34:IFET=8THEN3
     386                :REM*127
3448 NEXTI              :REM*217
345Ø PRINT#5,"EOF"      :REM*29
3452 CLOSE5:CLOSE15:CK=Ø:GOTO338
     6                  :REM*155
3454 REM----LOAD REPORT FORMAT
                        :REM*177
3456 PRINT"{SHFT CLR}{COMD 6} AV
     AILABLE CALC FORMAT FILES A
     RE:{CTRL 8}{CRSR DN}":@"$Ø:
     CR]*"              :REM*231
3457 PRINT"{CRSR DN}{COMD 6} LOA
     D FORMAT FROM WHAT FILE?{CT
     RL 8}"             :REM*26
3458 PRINT"{CRSR DN} ? "NF$:INPU
     T"{CRSR UP} ";CF$:IFCF$=""T
     HEN3386            :REM*157
346Ø PRINT"{CRSR DN} LOADING CAL
     CULATED REPORT FORMAT"
                        :REM*63
3462 OPEN15,8,15:OPEN5,8,5,"Ø:CR
     ] "+CF$+",S,R":GOSUB3Ø34:IF
     ET=8THEN3386       :REM*133
3464 IFEN=62THENGOSUB3Ø36:GOTO33
     86                 :REM*89
3466 INPUT#5,PW,NL,NC:GOSUB3Ø34:
     IFET=8THEN3386     :REM*2Ø5
3468 FORJ=1TONL:INPUT#5,TT$(J):N
     EXTJ:GOSUB3Ø34:IFET=8THEN33
     86                 :REM*53
347Ø FORI=1TONC:INPUT#5,PC(I),HC
     $(I):GOSUB3Ø34:IFET=8THEN33
     86                 :REM*43
3472 FORJ=ØTO14:INPUT#5,C$(I,J):
     NEXTJ:GOSUB3Ø34:IFET=8THEN3
     386                :REM*73
3474 NEXTI              :REM*243
3476 CLOSE5:CLOSE15     :REM*1Ø7
3478 FL=1:GOTO3386      :REM*239
348Ø REM----START PRINT PROCESS
                        :REM*89
3482 REM----OPEN DATAFILE CHANNE
     L AND POSITION TO RECORDS
                        :REM*231
3484 OPEN15,8,15:OPEN5,8,5,"Ø:DF
     ] "+NF$+",S,R":GOSUB3Ø34:IF
     ET=8THEN3386       :REM*17
3486 IFEN=62THENGOSUB3Ø36:GOTO33
     86                 :REM*111
3488 INPUT#5,RR,F,XR:GOSUB3Ø34:I
     FET=8THEN3386      :REM*113
349Ø FORN=1TOF:INPUT#5,F$(N),L%(
     N):NEXTN:GOSUB3Ø34:IFET=8TH
     EN3386             :REM*189
3492 RETURN             :REM*235
3494 REM----PRINT OPTIONS MENU
                        :REM*215
3496 PG=1:PRINT"{CTRL 8}{SHFT CL
     R} {CTRL 9}{11 SPACEs}PRINT
      OPTIONS MENU{9 SPACEs}{CTR
     L Ø}"              :REM*145
35ØØ PRINT"{2 CRSR DNs}{5 SPACEs
     }{CTRL 9}{CTRL 2}A{COMD 6}{
     CTRL Ø}LL RECORDS IN FILE"
                        :REM*245
35Ø2 PRINT"{CRSR DN}{5 SPACEs}{C
     TRL 9}{CTRL 2}F{COMD 6}{CTR
     L Ø}IND RECORDS WITH COMMON
      FIELDS"           :REM*37
35Ø4 PRINT"{CRSR DN}{5 SPACEs}{C
     TRL 9}{CTRL 2}E{COMD 6}{CTR
     L Ø}XIT BACK TO START"
                        :REM*199
35Ø6 PRINT"{CRSR DN}{3 SPACEs}PO
     SITION PAPER AT TOP OF PAGE
     "                  :REM*223
35Ø8 PRINT"{CRSR DN} {CTRL 8}{CT
     RL 9}{5 SPACEs}PRESS THE AP
     PROPRIATE KEY{6 SPACEs}"
                        :REM*95
351Ø GOSUB3Ø18:IFA$="E"THEN3386
                        :REM*111
3512 IFA$="A"THEN355Ø   :REM*255
3514 IFA$="F"THEN352Ø   :REM*85
3516 GOSUB6Ø2:GOTO351Ø  :REM*49
3518 REM----FIND RECORD (SEARCH)
                        :REM*39
352Ø PRINT"{SHFT CLR}{CTRL 8} {C
     TRL 9}{4 SPACEs}FIND RECORD
     S WITH COMMON ITEMS{4 SPACE
     s}"                :REM*143
3522 GOSUB3484          :REM*249
3524 FORN=1TOF:PRINT" {CTRL 2}{C
     TRL 9}"N"{CTRL Ø}{COMD 6} "
     F$(N):NEXTN        :REM*91
3526 INPUT"{CRSR DN}{COMD 6} WHI
     CH FIELD IS TO BE SEARCHED{
     CTRL 8}";SF        :REM*127
3528 IFSF<ØORSF>FTHENPRINT"{3 CR
     SR UPs}":GOTO3526  :REM*93
353Ø PRINT"{COMD 6} ENTER {CTRL
     9}COMMON ITEM{CTRL Ø}":PRIN
     T" (THE ENTIRE STRING IS NO
     T REQUIRED)"       :REM*157
```

```
3532 PRINT"{COMD 6} {CTRL 9}"F$(
     SF)"{CTRL Ø}{CTRL 8} ";:INP
     UTT$                  :REM*1Ø1
3534 PRINT"{SHFT CLR}":GOSUB3568
                           :REM*93
3536 FORI=1TOXR:IFP<>4THENPRINT"
      SEARCHING RECORD"I"{CRSR U
     P}"                   :REM*61
3538 FORN=1TOF:INPUT#5,REC$(N):N
     EXTN:GOSUB3Ø34:IFET=8THEN33
     86                    :REM*89
354Ø IFT$=LEFT$(REC$(SF),LEN(T$)
     )THENGOSUB3622        :REM*171
3542 NEXTI:GOSUB3662       :REM*15
3544 PRINT#PF,"FILE: "NF$","K"OF
     "XR"RECORDS REPORTED"
                           :REM*189
3545 CLOSE5:CLOSE15:IFP=4THEN356
     5                     :REM*24
3546 FORI=1TO6Ø-PL:GOSUB4Ø34:NEX
     TI:GOTO3496           :REM*1Ø1
3548 REM----PRINT ALL RECORDS
                           :REM*99
355Ø PRINT"{SHFT CLR}":IFP<>4THE
     NPRINT"{CRSR DN} PRINTING H
     EADING"               :REM*197
3552 GOSUB3568:GOSUB3484:REM*2Ø5
3554 PRINT"{CRSR UP}";:FORI=1TOX
     R:IFP<>4THENPRINT" READING
     RECORD #"I"{CRSR UP}"
                           :REM*53
3556 FORN=1TOF:INPUT#5,REC$(N):N
     EXTN:GOSUB3Ø34:IFET=8THEN33
     86                    :REM*1Ø7
3558 GOSUB3622             :REM*249
356Ø NEXTI:GOSUB3662       :REM*33
3562 PRINT#PF,"FILE: "NF$","K"RE
     CORDS REPORTED"       :REM*141
3563 CLOSE5:CLOSE15:IFP=4THEN356
     5                     :REM*42
3564 FORI=1TO6Ø-PL:GOSUB4Ø34:NEX
     TI:GOTO3496           :REM*119
3565 PRINT"PRESS {CTRL 9}ANY KEY
     {CTRL Ø}":GOSUB3Ø18:GOTO349
     6                     :REM*234
3566 REM----BEGIN REPORT/CENTER
     TITLE                 :REM*83
3568 PL=Ø:TA=Ø:K=Ø:FORJ=1TONC:SU
     M(J)=Ø:NEXTJ          :REM*211
357Ø FORJ=1TONC:IFC$(J,13)<>"N"T
     HENTL=1               :REM*247
3572 NEXTJ:FORJ=1TONL:IFTT$(J)<>
     ">"THENGOSUB3576      :REM*151
3574 NEXTJ:GOTO3584        :REM*59
3576 M=INT((PW-LEN(TT$(J)))/2):I
     FP<>1THEN358Ø         :REM*245
3578 PRINT#PF,LEFT$(S$,M)+TT$(J)
     ;B1$;:PL=PL+1:RETURN:REM*15
358Ø PRINT#PF,LEFT$(S$,M)+TT$(J)
     ;B1$:PL=PL+1:RETURN   :REM*9
3582 REM----POSITION HEADINGS
                           :REM*87
3584 GOSUB3618:J=1:PC(NC+1)=PW+3
     :CW=PC(2)-2-PC(1)     :REM*254
3586 CLM$=HC$(J)           :REM*184
3588 IFC$(J,Ø)="L"THENGOSUB3926:
     GOTO3592              :REM*9Ø
359Ø GOSUB3918             :REM*172
3592 IFPC(1)>1THEN3596     :REM*54
3594 PRINT#PF,CLM$;:GOTO3598
                           :REM*8Ø
3596 PRINT#PF,LEFT$(S$,PC(1)-1)+
     CLM$;                 :REM*126
3598 FORJ=2TONC            :REM*124
36ØØ CW=PC(J+1)-2-PC(J):CLM$=HC$
     (J)                   :REM*194
36Ø2 IFC$(J,Ø)="L"THENGOSUB3926:
     GOTO36Ø6              :REM*232
36Ø4 GOSUB3918             :REM*186
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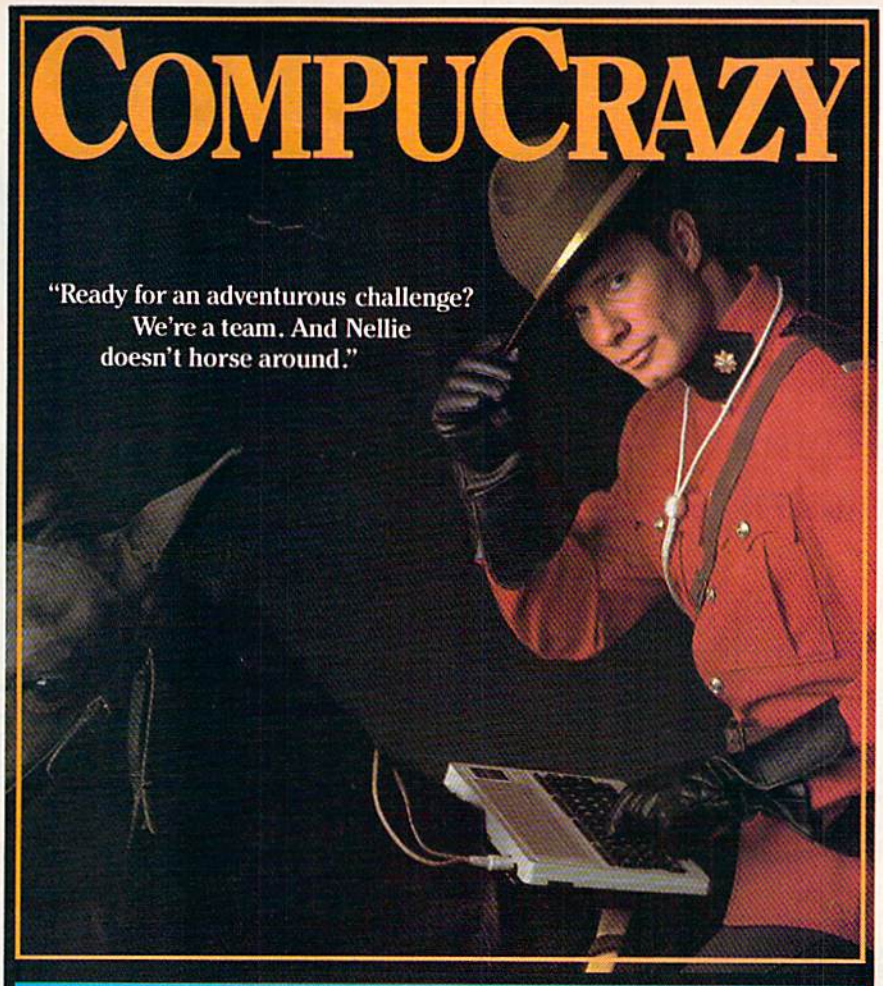
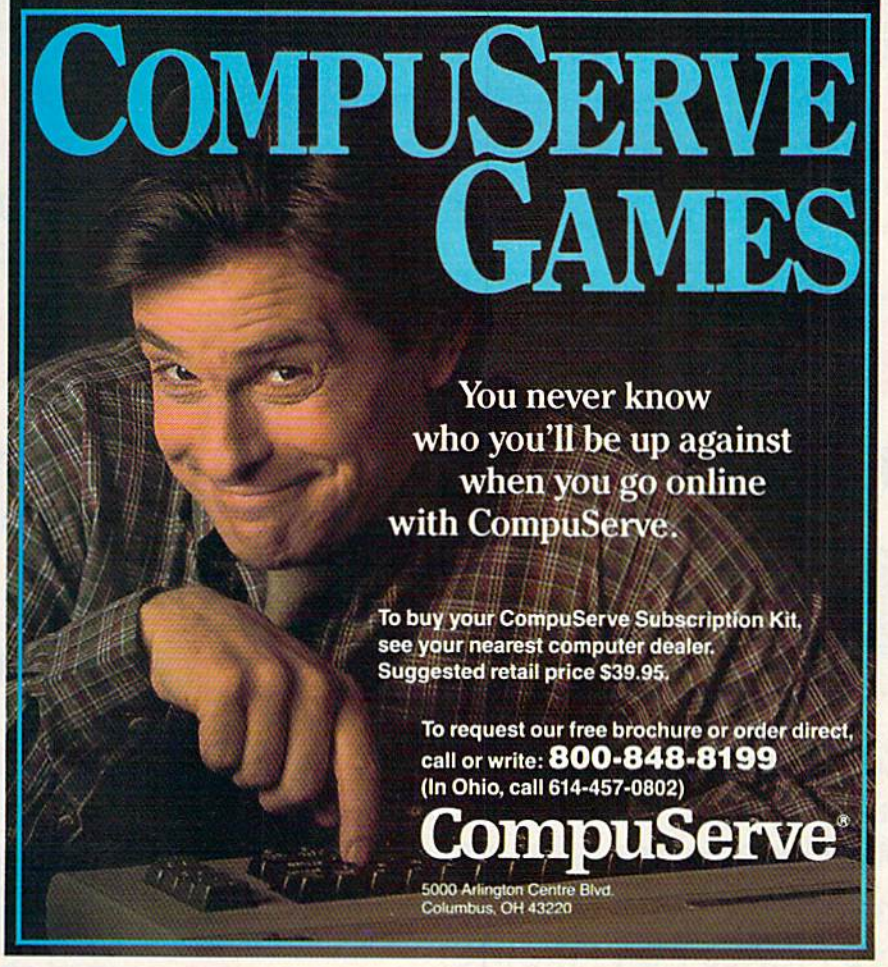
Continued on p. 88.

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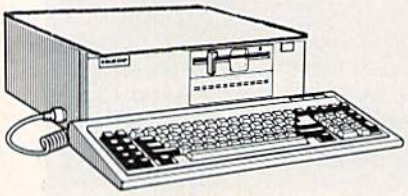

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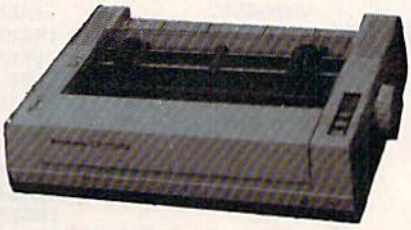

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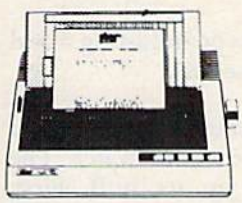

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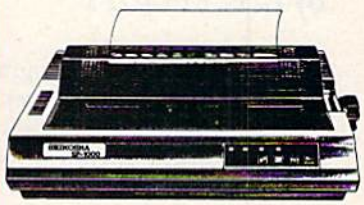

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THE MENU MACHINE

With these instant menu routines, you can concentrate on writing the important parts of your program.

By E. E. ELLIOTT

Certainly, a good program needs a good menu. However, creating a menu is a tedious task at best, and is it worth spending practically as much time creating the menu as writing the rest of the program?

I wrote The Menu Machine to circumvent the problem of coding menu routines. It will take over this uninspiring part of programming for you and create impressive menus for your programs.

Each menu created with The Menu Machine appears inside a border that's sized for that menu, and the entire display is centered on the screen. You make your choices by pressing the cursor-down key until the desired selection is highlighted and then hitting the return key.

Three limitations apply when you're using The Menu Machine. First, you can include no more than eight items in each menu, although you can chain together a number of menus to effectively have more than eight choices. Second, you can't use line numbers from 20000 to 20250 elsewhere in your program unless you renumber the menu routine created by The Menu Machine. Finally, the menu routine uses the following variable names: RE, LE, TP, M, I, PL, S, K$, C, R, T, TL$, TR$, ME$(0)–ME$(8), BL$, BR$, VR$ and HZ$. If you use these names elsewhere in your program, you must be sure to reset their values after exiting from the menu routine.

You'll find it helpful to finish writing your main program before creating the menu routine, because you'll need to know where each menu choice branches to in the program. As you're creating the menu routine, the program in Listing 1 will prompt you to enter line numbers (target lines) where execution will go after each menu selection is made.

Entering Menu Information

Type in Listing 1 and be sure to save it to disk before running it, because lines 100–420 are deleted during execution. When you run Listing 1, it first asks you to enter the number of items, from one to eight, that you want the menu to have. For a sample menu, enter 4 and press the return key.

Then you must type in the title of your menu. Enter any title up to 30 characters long.

Next, you're prompted for the text of the first menu item. For our sample, enter SELECTION 1 and press return. You're then asked for the target line number that the program should jump to when this menu item is chosen. Enter 1000. Prompts for name and target line continue through all the menu items. Enter the following information for choices two through four:

SELECTION 2, 2000
SELECTION 3, 3000
SELECTION 4, 4000

After you've completed the fourth entry, information begins flashing on the screen as the program creates your menu routine. When the cursor reappears, the program reminds you to save your menu routine before continuing. Save it to disk at this time.

Now clear the memory, type in Listing 2 and save it to the disk that contains the menu routine Listing 1 created. Finally, type in Listing 3 and save it to the same disk.

Putting It All Together

Now you're ready to watch The Menu Machine do its stuff. First, make sure that the disk containing all three programs is in your disk drive. Then load in and run Listing 3 to append Listing 2 to the menu routine created by Listing 1. A prompt will appear asking Program To Append? Enter the filename of Listing 2 and press the return key. At the next prompt, specify your drive number.

When you see the cursor again, enter RUN and press the return key. At the first prompt, type in the filename of the menu routine you created with Listing 1 and press the return key. Once again, enter the device number and press return.

Finally, list the appended program and delete lines 1–6. Save the finished program to disk, and there you have it! A lean, mean, menu-driven machine.

There's More!

As I mentioned earlier, you can create multiple menus with The Menu Machine. You do this by renumbering the menu routines as they are created. You can also link two or more menus together by making the last choice in a menu read Next Menu or Other and using the next menu as the target line number for that choice.

When the menu routines are used in a program that requires information to be formatted on the screen, you can position your cursor anywhere by setting C equal to the column number and R equal to the row

If the space program had advanced as fast as the computer industry, this might be the view from your office.

And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost $486,840.22 in 1946 dollars. Today a $2,000 portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

The collective brainpower of computers sold in the next two years will equal that of all computers sold from the beginning to now. Four years from now it will have doubled again.

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number. Then use a GOSUB 20240 to execute this feature. R

Address all author correspondence to E. E. Elliott, 9118 Port Hudson, San Antonio, TX 78245.

Listing 1.

```
1ØØ POKE5328Ø,6:POKE53281,6:POKE
    646,7:Q$=CHR$(34)     :REM*5Ø
11Ø LI$="{CRSR DN}{29 SHFT Es}{U
    P ARROW}(3Ø){34 CRSR LFs}{CR
    SR UP}                :REM*244
12Ø PRINT"{SHFT CLR}{2 CRSR DNs}
    ENTER NUMBER OF MENU ITEMS (
    1-8) : ";             :REM*56
13Ø GETZ$:IFZ$<"1"ORZ$>"8"THEN13
    Ø                     :REM*94
14Ø PRINTZ$:I=VAL(Z$):TP=INT((24
    -2*I)/2-1):BM=TP+2*I+2
                          :REM*68
15Ø PRINT"{2 CRSR DNs}{CTRL 9}EN
    TER MENU TITLE":PRINTLI$;:GO
    SUB29Ø:ME$(Ø)=IN$     :REM*72
16Ø FORT=1TOI:PRINT"{2 CRSR DNs}
    {CTRL 9}ENTER MENU ITEM"T"{C
    RSR DN}":PRINTLI$;:GOSUB29Ø:
    ME$(T)=IN$            :REM*22Ø
17Ø PRINT"{CRSR DN}{CTRL 9}JUMPS
     TO LINE NUMBER -";:GOSUB29Ø
    :LO(T)=VAL(IN$)       :REM*Ø
18Ø TL=LEN(ME$(T))+2:IFTL>PLTHEN
    PL=TL                 :REM*52
19Ø NEXT:RE=INT((4Ø-PL)/2-1):LE=
    RE+PL+1               :REM*146
2ØØ PRINT"{SHFT CLR}2ØØØØ RE=";R
    E;":LE=";LE;":TP=";TP;":BM="
    ;BM;":I=";I":PL=";PL  :REM*14
21Ø FORT=ØTOISTEP2:PRINT2ØØ1Ø+(1
    Ø*T);"ME$(";T;")="Q$;ME$(T);
    Q$;                   :REM*238
22Ø IFME$(T+1)=""THENPRINT:GOTO2
    4Ø                    :REM*158
23Ø PRINT":ME$(";T+1;")="Q$;ME$(
    T+1);Q$:NEXT          :REM*126
24Ø A$="":FORT=1TOI-1:A$=A$+STR$
    (LO(T))+",":NEXT:A$=A$+STR$(
    LO(I))                :REM*234
25Ø PRINT"2Ø23Ø ONTGOTO";A$
                          :REM*218
26Ø T=INT(I/2+.5)+4       :REM*87
27Ø POKE198,T+1:POKE631,19:FORI=
    1TOT:POKE631+I,13:NEXT
                          :REM*153
28Ø PRINT"GOTO 36Ø":END   :REM*23
29Ø IN$="":ZQ$=CHR$(166)+CHR$(15
    7):PRINTZQ$;          :REM*195
3ØØ GETZ$:IFZ$=""THEN3ØØ :REM*71
31Ø Z=ASC(Z$):IFZ=13THENPRINT" "
    :RETURN               :REM*199
32Ø IFIN$<>""THENIFZ=2ØTHENPRINT
    Z$;ZQ$;:IN$=LEFT$(IN$,LEN(IN
    $)-1):GOTO3ØØ         :REM*129
33Ø IFZ=2ØTHEN3ØØ         :REM*241
34Ø IFLEN(IN$)=3ØTHEN3ØØ:REM*213
35Ø PRINTZ$;ZQ$;:IN$=IN$+Z$:GOTO
    3ØØ                   :REM*43
36Ø T=9Ø                  :REM*235
37Ø PRINT"{SHFT CLR}"T:PRINT"T="
    T+1Ø;:IFT<37ØTHENPRINT":GOTO
    37Ø"                  :REM*1Ø7
38Ø IFT=37ØTHENPRINT"{SHFT CLR}3
    7Ø":PRINT"38Ø":PRINT"GOTO 4Ø
    Ø"                    :REM*157
39Ø POKE198,4:POKE631,19:FORT=63
    2TO634:POKET,13:NEXT:END
                          :REM*2Ø7
4ØØ PRINT"{SHFT CLR}{6 CRSR DNs}
    YOUR MENU MAY NOW BE SAVED."
    :K$=CHR$(13):PRINT"{HOME}{CT
    RL 7}39Ø"K$"4ØØ"      :REM*53
41Ø PRINT"41Ø"K$"42Ø"     :REM*11
42Ø POKE198,6:POKE631,19:FORT=63
    2TO635:POKET,13:NEXT:POKE636
    ,158:END              :REM*235
2Ø1ØØ K$=CHR$(13):PRINT"{SHFT CL
     R}{CRSR DN}";TAB(2Ø-(LEN(M
     E$(Ø))/2));"{CTRL 9}";ME$(
     Ø)                   :REM*242
2Ø11Ø C=RE+2:R=TP+2:FORT=1TOI:GO
     SUB2Ø24Ø:TL$=CHR$(213):TR$
     =CHR$(2Ø1)           :REM*142
2Ø12Ø PRINTME$(T):R=R+2:NEXT:BL$
     =CHR$(2Ø2):BR$=CHR$(2Ø3):V
     R$=CHR$(221)         :REM*174
2Ø13Ø HZ$=CHR$(192):R=BM+2:C=5:G
     OSUB2Ø24Ø:PRINT"MAKE CHOIC
     E AND PRESS <RETURN>
                          :REM*196
2Ø14Ø C=RE:R=TP:GOSUB2Ø24Ø:PRINT
     TL$;:FORT=1TOPL:PRINTHZ$;:
     NEXT:PRINTTR$        :REM*14
2Ø15Ø FORR=TP+1TOBM-1:GOSUB2Ø24Ø
     :PRINTVR$;TAB(LE);VR$:NEXT
                          :REM*54
2Ø16Ø R=BM:GOSUB2Ø24Ø:PRINTBL$;:
     FORT=1TOPL:PRINTHZ$;:NEXT:
     PRINTBR$             :REM*192
2Ø17Ø C=RE+2:R=TP+2:T=1   :REM*28
2Ø18Ø GOSUB2Ø24Ø:PRINT"{CTRL 9}"
     ME$(T)               :REM*132
2Ø19Ø GETZ$:IFZ$<>CHR$(17)ANDZ$<
     >K$THEN2Ø19Ø         :REM*21Ø
2Ø2ØØ IFZ$=K$THEN2Ø23Ø    :REM*74
2Ø21Ø IFT=ITHENGOSUB2Ø24Ø:PRINTM
     E$(T):GOTO2Ø17Ø      :REM*128
2Ø22Ø GOSUB2Ø24Ø:PRINTME$(T):T=T
     +1:R=R+2:GOTO2Ø18Ø:REM*134
2Ø24Ø POKE211,C:POKE214,R:SYS587
     32:REM POSITION CURSOR
                          :REM*227
2Ø25Ø RETURN              :REM*163
```

Listing 2.

```
999 RUN2ØØØØ             :REM*212
1ØØØ PRINT"{SHFT CLR}CONGRATULAT
     IONS! YOUR PROGRAM WORKS
                          :REM*151
1ØØ1 PRINT"PROPERLY!"     :REM*236
1ØØ2 FOR T=1TO2ØØØ:NEXT:RUN2ØØØØ
                          :REM*75
2ØØØ POKE53281,1          :REM*141
2ØØ1 PRINT"{SHFT CLR}{CTRL 8}THI
     S IS MENU SELECTION #2":GOT
     O 5ØØØ               :REM*174
3ØØØ POKE53281,7          :REM*133
3ØØ1 PRINT"{SHFT CLR}{CTRL 2}THI
     S IS MENU SELECTION #3":GOT
     O5ØØØ                :REM*166
4ØØØ POKE 53281,5         :REM*1Ø9
4ØØ1 PRINT"{SHFT CLR}{COMD 8}THI
     S IS MENU SELECTION #4":GOT
     O5ØØØ                :REM*168
5ØØØ FORT=1TO25ØØ:NEXT:POKE 5328
     1,Ø:RUN2ØØØØ         :REM*1Ø3
```

Listing 3.

```
1 INPUT"PROGRAM TO APPEND";A$:IN
  PUT"{5 SPACEs}DRIVE 8 OR 9";U:
   REM C-64 & VIC-2Ø       :REM*117
2 A=PEEK(44):PRINT"{SHFT CLR}{3
  CRSR DNs}LOAD";CHR$(34);A$;CHR
  $(34);CHR$(44);U         :REM*2Ø8
3 PRINT"{4 CRSR DNs}POKE43,1:POK
  E44,";A;"{HOME}"         :REM*3
4 POKE632,13:POKE633,13:POKE634,
  13:POKE198,3             :REM*16
5 IFPEEK(45)<2THENPOKE43,PEEK(45
  )-2+255:POKE44,PEEK(46)-1:END
                           :REM*11
6 POKE43,PEEK(45)-2:POKE44,PEEK(
  46):END                  :REM*92
```

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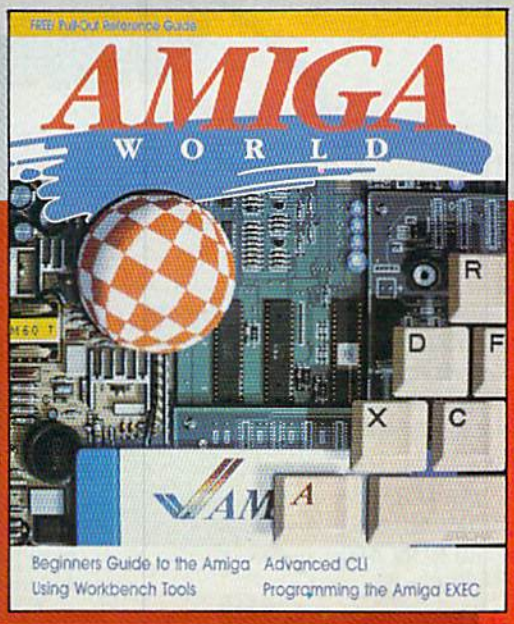
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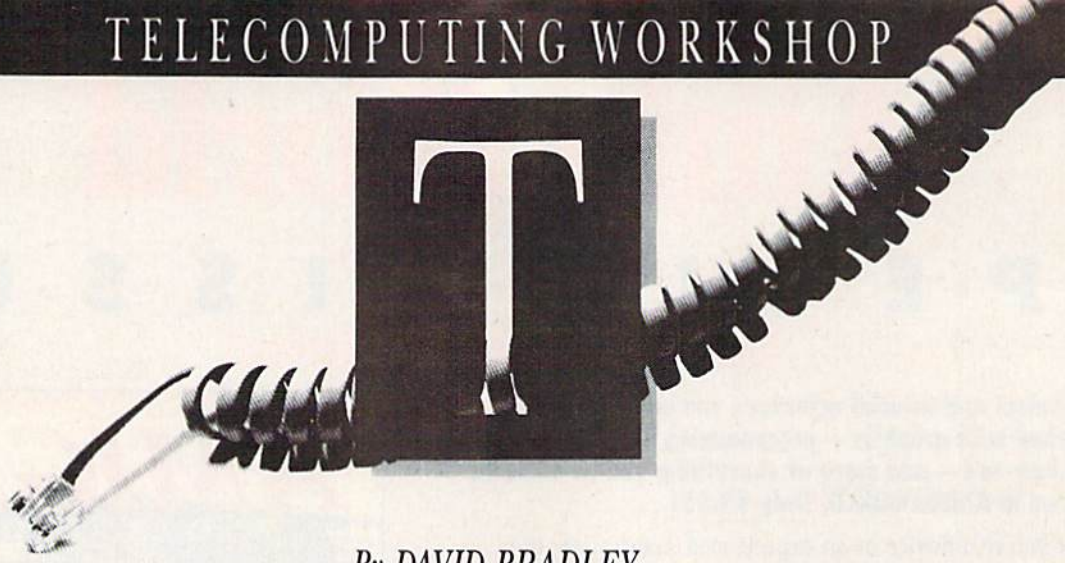

By DAVID BRADLEY

Telecomputing Workshop is a monthly column dedicated to the needs of RUN *readers who are using, or intend to use, a Commodore computer for telecommunications. We invite you to submit your questions or comments to:*

David Bradley
Telecomputing Workshop
c/o RUN *Magazine*
80 Elm St.
Peterborough, NH 03458

Thank you for helping me locate Kermit, a DEC VT100 terminal emulation program for microcomputer-to-mainframe file transfers. Now I can upload files from home to the computer at my university. The package that came with my 1670 modem and C-128 wouldn't throttle the transfers, so I lost data intermittently, no matter what I tried.

I still have one question. The version of Kermit that I got from Public Domain Solutions works only in the C-128's 64 mode. Where can I get this protocol for the 128 mode?

Rich Vandagriff
Irvine, CA

I don't know of a 128 mode terminal program that supports Kermit. I'll look around and report back if I find one. From the sounds of it, the 64 mode program is doing the job, so, until a 128 solution becomes available, you should get along just fine.

I have a C-128 and a 1670 modem and have been trying to write an autodialer program for them. However, I can't figure out the correct Open and Print# statements to get the modem to dial numbers and perform other AT commands. Can you help?

Errol Korn
Boulder, CO

The little program below should make the 1670 dial the RUNning Board's telephone number:

```
10 OPEN 2,2,0,CHR$(6)+CHR$(0)
20 PRINT#2,'ATDT
   16039249704'
```

The ATDT will dial tone while ATDP will dial pulse.

I own a C-64, a 1541 and two modems. One modem is a TeleLearning 64 and the other is a Volks 6470 with autodial. I have the telecommunications software and manuals that came with each of these units, but I need software with VT100 emulation, so I can access the mainframe computer at the university I attend. Do you know of any such program? I'd also like the terminal program to accommodate either Punter or Xmodem protocol.

Emanuel M. Canaday
Jennings, MO

A commercial program that will work with your TeleLearning 64 modem and do everything you've listed is BobsTerm Pro. Mark A. Bennett from Elma, New York, uses it with his C-128 and a 1670 modem and recommends it highly. It costs about $80 and is available for the C-64 and the C-128 (in 128 mode). Public Domain Solutions, PO Box 832, Tallevast, FL 34270, should have some public domain terminal programs for both of your modems if you find the price of BobsTerm Pro prohibitive.

I just read your column in the December 1986 issue of *RUN*. I'd like to respond to the question asked by Edward P. Young of Zelienople, Pennsylvania. I too received a modem when I signed up for Q-Link. They sent me a "64 modem" with no user guide. I wrote to TeleLearning Systems for a manual, as you suggested in the December column, but they no longer support that modem and didn't send me a manual. They did suggest user's groups as good places to exchange information regarding modems.

Debra A. Doman
Triadelphia, WV

Thanks for the information on TeleLearning's lack of support. It looks like anyone who has a question about using a "64 modem" from TeleLearning has a choice of checking with a local user's group or writing to Telecomputing Workshop.

On page 114 of last December's issue of *RUN*, you reported you had found a device, costing $34.95, for protecting modems from power surges. We make a device called the EMF-232 that's effective against

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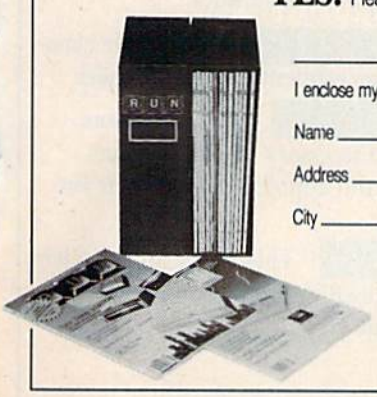

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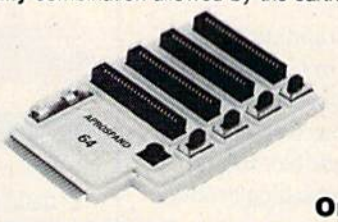

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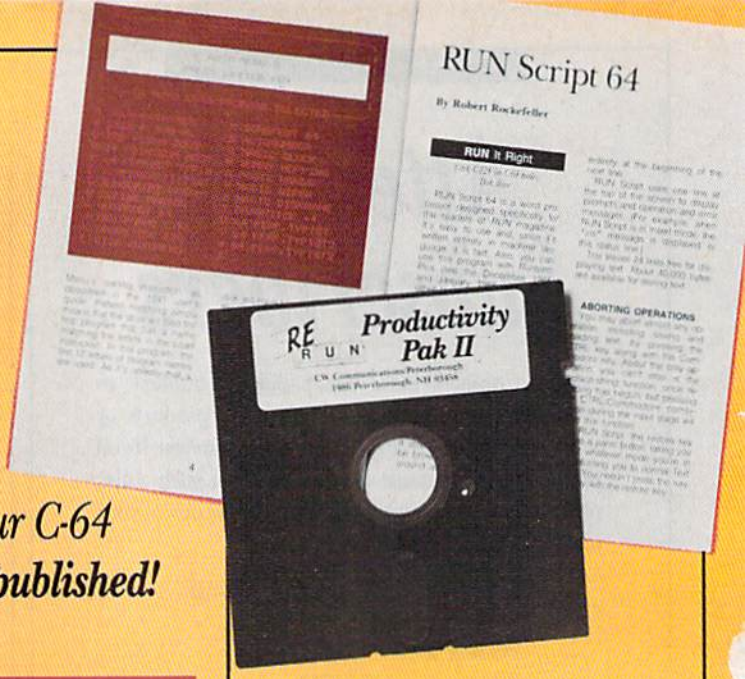

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I have a C-128 and an Avatex 1200 modem connected with a Deluxe RS-232 interface from Omnitronix. I've used several programs with this system successfully, but I have one special problem. I work with a network of the Presbyterian Church called Presbynet. Several times now, I've accidentally gotten into long sessions where the network is transmitting background information to me. Since this is costly, I want to interrupt the flow and move on to something else, especially if I find the information is not especially useful.

My system recognizes an ASCII Delete, which is hex 7F (ASCII 127), as an interrupt, but most of the programs I use don't tell me how to generate this character. I've used Runterm, Electronic Cottage (downloaded from QuantumLink), Speedterm (Abacus) and others.

George Wilson
Donalds, SC

A program that will send the character you need is DarkTerm 4.B, a public domain C-64 terminal program that works with the Commodore 1650 and 1670 modems and the Avatex 1200 modem. To get it, send $5, plus $1 for postage and handling, to Public Domain Solutions, PO Box 832, Tallevast, FL 34270. Tell them I told you to ask for DarkTerm 4.B. Also tell them what you told me, in case they have other programs (maybe one in 128 mode) that will send an ASCII Delete.

I'd like to find out what it would take to start a BBS. I currently own a C-64, a 1541 disk drive, an MPS-801 printer and an MPP-1064 modem. Would one of those $40 BBS programs be good enough for a small, local board? Would I need any other equipment? Could a user damage my equipment while accessing the BBS? Would there be a lot of time involved in system upkeep?

R. H. King
New Bedford, MA

To start a BBS you need a computer, at least one disk drive, an auto-answer modem and a BBS program, so you can start with the equipment you have. You might want to add other equipment after you get your board established, but I'd suggest not buying anything new now, in case you find being a SYSOP is not for you.

There are a lot of commercial and public domain BBS programs available. Just about any of them would get you going. However, before you order one, make sure it will work with the modem and the rest of the equipment you have. Why not check with the BBS's in your area to see if you like any of the programs other people are running. If you find a promising one, ask the SYSOP where he or she got it and what it runs on.

Running a BBS does take quite a bit of time, but how much really depends on the BBS program and how busy the board is. I don't know of any way a user of your BBS could harm your equipment.

I've heard that you run a BBS. What software and hardware do you use, what is the name of your BBS and what is the telephone number?

Louie Jumper
New York, NY

My bulletin board, called David Bradley's BBS, runs on Steve Punter's BBS program and is node 13 on the PunterNet. It runs on a C-64, an Omnitronix Deluxe RS-232 interface, a Hayes 1200 modem, a game port expander, a C-Link, a PET-IEEE cable, a Comrex 220 printer with a Wilanta Arts descender-adding ROM, a Comrex monitor on a swivel stand, a WT Devices Spike Arrester power bar, two IEEE-IEEE cables and three 9090 hard disk drives.

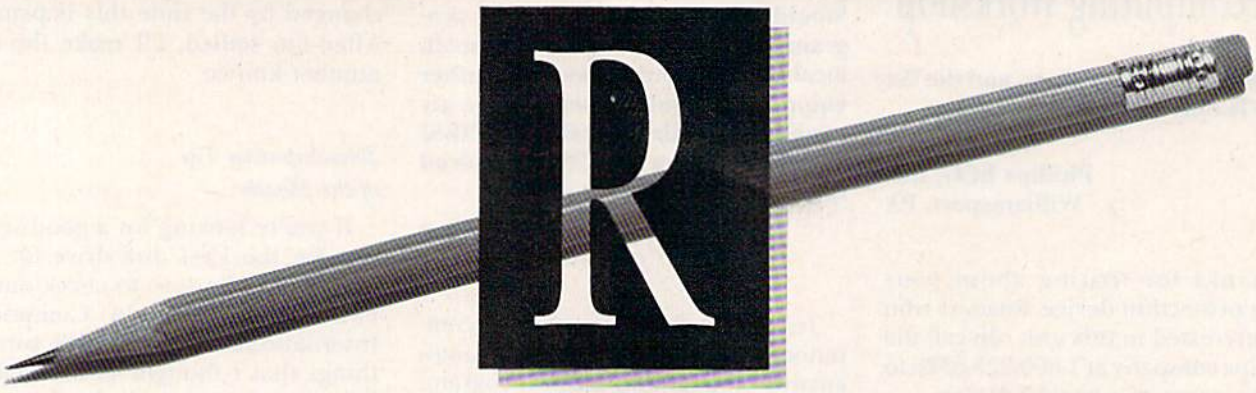
I'd give out the number, but since I'm getting married and moving to Florida, the number will have changed by the time this is printed. After I'm settled, I'll make the new number known.

Telecomputing Tip of the Month

If you're looking for a good substitute for the 1541 disk drive for running a BBS, be sure to check out the FSD-1 from Emerald Component International. I've tried all sorts of things that I thought would make it fail, but the great little drive just won't. For more information, read Bill Ruddick's review on page 78 of the September 1986 issue of *RUN*. Back issues of *RUN* are available for $3.50, plus $1 shipping and handling, from *RUN* Magazine, Back Issues, 80 Elm St., Peterborough, NH 03458.■

David Bradley has been involved in telecommunications with Commodores since 1982. He runs his own BBS and is a member of the Board of Directors of the Toronto PET Users Group (TPUG).

RUN is a publication of CW Communications/Inc. (CWCI), an International Data Group (IDG) company. CWCI is the world's largest publisher of computer-related periodicals, with more than 70 computer publications in 28 countries. 12 million people read one or more of CWCI's publications each month. Members of the CWCI group are connected by and contribute to the *CW International News Service*, offering the latest domestic and international computer news. Members of the group include: ARGENTINA'S *Computerworld Argentina, PC Mundo*; ASIA'S *Asian Computerworld, Communications World*; AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld*; AUSTRIA'S *Computerwelt Oesterreich*; BRAZIL'S *DataNews, PC Mundo*; CHILE'S *Informatica, Computacion Personal*; DENMARK'S *Computerworld Danmark, PC World Danmark, RUN*; FINLAND'S *Tietoviikko, Mikro*; FRANCE'S *Le Monde Informatique, Distributique, Golden, InfoPC, Theoreme, Le Monde des Telecoms*; GREECE'S *Micro & Computer Age*; HUNGARY'S *SZT Computerworld, Mikrovilag*; INDIA'S *Dataquest*; ISRAEL'S *People & Computers Monthly, People & Computers Weekly*; ITALY'S *Computerworld Italia, PC World Magazine*; JAPAN'S *Computerworld Japan*; MEXICO'S *Computerworld Mexico*; THE NETHERLANDS' *Computerworld Netherlands, PC World Netherlands*; NEW ZEALAND'S *Computerworld New Zealand*; NORWAY'S *PC Mikrodata, Computerworld Norge*; PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld*; SAUDI ARABIA'S *Arabian Computer News*; SOUTH KOREA'S *The Electronic Times*; SPAIN'S *Computerworld Espana, Commodore World, PC World Espana*; SWEDEN'S *Computer Sweden, Mikrodatorn, Svenska PC World*; SWITZERLAND'S *Computerworld Schweiz*; UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, PC Business World*; UNITED STATES' *AmigaWorld, Boston Computer News, Computerworld, Digital News, 80 Micro, FOCUS Publications, inCider, InfoWorld, MacWorld, Micro Marketworld, Network World, PC World, Publish!, RUN*; VENEZUELA'S *Computerworld Venezuela, PC World Venezuela*; WEST GERMANY'S *Computerwoche, PC Welt, Computer Business, Run, InfoWelt.*



By MARGARET MORABITO

Low-cost, high-quality educational software is not a pipe dream. You just have to know where to find it.

Inexpensive educational software is a major force behind the use of computers in the home, and it can help make your hardware investment pay off without pushing you deeper into debt. Low-cost software is also a boon to schools on restrictive budgets.

Most of this software is called "public domain," which refers to the fact that it's been released for access by whoever wants it, either for free or at a minimal price. The programs can be legally duplicated and distributed on disks or on-line.

Professional programmers sometimes donate work to the public domain, and so do many unknowns, who may create gems that are worth far more than you'd pay for a commercial program. Public domain programs run the gamut from excellent to useless, but with time and effort you can find the great ones.

What Is Public Domain?

If you're not sure what public domain is, it may clarify it more to learn what it's *not*. A common, but mistaken, belief is that programs from computer magazines are free software for you to copy and hand out to your friends. Unfortunately, magazine programs are usually copyrighted and belong to the magazine that published them. Most magazines don't relinquish their ownership and consider copying their programs for distribution illegal.

Readers of this column have been fortunate; *RUN* gave me special permission last year to release to the public domain some of the best educational programs its readers had sent in. If other computer magazines followed suit, they could greatly help the proliferation of good educational programs.

Another mistaken belief is that if a program isn't copy-protected, it's in the public domain. While most commercial software companies build in copy-protection schemes that prevent you from making duplicates, a growing number of companies believe copy protection isn't worth the bother. However, the programs from these companies are still under copyright, should not be copied and definitely are not in the public domain. The documentation that comes with a program will usually say if the manufacturer forbids copying for distribution.

Freeware

Another category of low-cost educational software is freeware, a hybrid between public domain and commercial. Freeware is not copy-protected; in fact, the author encourages you to copy and distribute it. These programs carry an internal message that identifies the programmer, provides his or her address and requests that you send money if you like the program and plan on using it. You're morally obligated to pay for what you use, but there's no legally binding contract between you and the programmer.

If you do send money to the programmer, you usually receive documentation, any updates that occur and help from the programmer as needed—things you don't get with most public domain software.

Finding Low-Cost Software

Though low-cost software is plentiful, it can be hard to find if you don't know where to look. The big ads in computer magazines are from commercial software companies, and the software you usually find in stores is also from commercial sources.

Read the small ads. People who distribute public domain software usually don't have the money to run flashy ads, but they may run a small black-and-white classified ad in the back of your favorite computer magazine. They also send flyers out to user's groups, for many such groups compile public domain programs onto disks that they sell at low cost to their members. In some cases, such software is distributed by large companies and is sold in retail outlets.

Wherever you get it, this software is usually priced at about $10 for a diskful of programs. The number of programs on the disk will vary from around 12 to 30, depending on whether the supplier needs or wants to make a profit. Your first step should be to write or call the public domain source and request a catalog of its programs.

Another source of information is a book entitled *How To Get Free Software*,

by Alfred Glossbrenner; St. Martin's Press, 1984.

Downloading

On-line networks and local bulletin boards often maintain large libraries of public domain programs. If you have a modem and a good terminal program, you can download (capture) this software from these databases. You pay only for the on-line time (if it's a subscription network) and your phone bill (if it's a long-distance call). A local BBS can provide you with totally free software.

A recent controversy arose over whether software on the on-line networks is considered in the public domain and thus available for copying and distribution. CompuServe claimed that its programs were available only to its subscribers, and that it was illegal to download, copy and then distribute them elsewhere.

This problem demonstrates the need to be sure that an on-line program is actually in the public domain before assuming you can do large-scale copying. Most folks download only what they need and then use it only at home. That's the plan you should follow.

If you've downloaded a program you'd like to distribute throughout your school, for example, and you're not sure this is proper, ask the manager of the on-line database to put you in touch with someone at the network who can authorize it.

QuantumLink, a national network for Commodore owners, maintains large databases of public domain educational software in its Learning Center. This software includes a 27-disk series of programs in all subjects and for all ages put out by Commodore Business Machines several years ago. You can also find this CBM software sold on disk at mass merchandisers who sell Commodore computers, and through mail-order ads.

In addition, I've built several libraries of quality educational software you can download from The Resource Center and Tutoring Center areas of QuantumLink's Learning Center. The programs in these two areas are not from Commodore and have been written by a wide variety of people who are committed to education.

Renting Commercial Software

A low-cost way of benefitting from commercial educational software is to rent it. Renting eliminates the problem of laying out the full purchase price and then discovering the program doesn't really fit the bill.

Rental costs vary, but they run about $5 to $12 for a two-week tryout period. There are several national mail-order companies and retail stores that rent software.

Let's Work Together

With so much educational software available, both commercial and public domain, the problem of sifting through it all and finding the worthwhile programs is difficult. School systems should consider forming groups of teachers and parents to take on the task of locating and evaluating this material. A school on a tight budget could come up with some valuable tools to use with its students, and it could share both disks and information about programs with others.

There are associations that evaluate commercial educational software, such as the Educational Products Information Exchange (PO Box 839, Water Mill, NY 11976). State and national organizations committed to handling the wealth of public domain and freeware programs would also be helpful.

Of course, user's groups could be most helpful in evaluating educational software. They could publish their results and then distribute them through a central agent, such as The Resource Center. I encourage you to share your evaluations and recommendations of public domain programs with me. I'll publish your findings in future columns. ■

If you're using Commodore computers for educational purposes (at home or in school) and would like to share your experiences through The Resource Center, write me a letter detailing the equipment you're using, subject areas you teach, grade level or age of your students, software you're using and any other information you feel like including.

Also, if you'd like to donate public domain educational programs to The Resource Center for sharing with other educators or parents, please send along a disk with a brief description of the program. Send correspondence and disks to:

Margaret Morabito
The Resource Center
c/o RUN Magazine
80 Elm St.
Peterborough, NH 03458

You can also leave mail in my on-line mailboxes: CompuServe (70616,714) or QuantumLink (MARGM).

Table 1. *Sources of free and low-cost educational software.*

CompuServe Information Network
5000 Arlington Centre Blvd.
PO Box 20212
Columbus, OH 43220

QuantumLink
8620 Westwood Center Drive
Vienna, VA 22180
800-392-8200

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Toronto Pet Users Group (TPUG)
5300 Yonge St.
Willowdale, Ontario
Canada M2N 5R2

Public Domain Users Group
PO Box 1442-FA
Orange Park, FL 32067

Adams Software Company
PO Box 1792
Springdale, AR 72765

64 Gold
3219 Folsom St.
San Francisco, CA 94110

Paceware, Inc.
PO Box 64-A
Pompano Beach, FL 33074

Kidware
PO Box 9762, Dept. F
Moscow, ID 83843

Clearinghouse for ESL Public Domain Software
201 Gordy Hall
Ohio University
Athens, OH 45701

Public Domain Solutions
PO Box 832
Tallevast, FL 34270

Wedgewood Software Rental
5316 Woodway Drive
Fort Worth, TX 76133

Rent-A-Disk
Frederick Bldg. #345
Huntington, WV 25701

National Public Domain Software Rental Center
1533 Avohill Drive
Vista, CA 92084

From p. 12.

Trick of the Month

$3CE C-64 disk default—Are you tired of typing ,8 on your C-64 every time you want to access a program from disk? Well, now you can make your computer default to disk instead of to tape, so you can load and save programs without typing ,8 after the filename. You don't even need a closing quote! The run-stop/restore combination disables this utility, but you can enable it again with SYS679.

```
1 REM 64 DISK DEFAULT-RICHARD PENN
1Ø FORU=679TO716:READQ:POKEU,Q:CK=CK+Q:NEXT
11 IFCK<>4119THEN PRINT"ERROR IN DATA":END
12 SYS 679
13 DATA 169,2,141,49,3,141,51,3,169,186
14 DATA 141,48,3,169,197,141,5Ø,3,96,169
15 DATA 8,133,186,169,Ø,133,1Ø,76,165
16 DATA 244,169,8,133,186,76,237,245,1Ø
```

Richard Penn
Montreal, Quebec, Canada

$3CF C-64 bar chart demo—This short program creates colorful bar charts to demonstrate a programming technique for presenting data graphically. The program uses random values to simulate the data needed to generate bars of various sizes and colors. If you've wanted to include bar charts in your Basic programming, but thought it might be too difficult, you might find helpful ideas in this demo program.

```
1Ø REM 64 BAR CHARTS-J.R.CHARNETSKI
2Ø POKE5328Ø,3:POKE53281,1:BW$="{CTRL 9}{2
   SPACEs}":CU$="{2 CRSR UPs}"
3Ø PRINT"{SHFT CLR}{CTRL 1}{2 CRSR DNs}"
4Ø FOR I=1TO2Ø:PRINT TAB(4)"{SHFT P}":NEXT
5Ø PRINTTAB(4);:FOR I=1TO32:PRINT"{COMD Y}"
   ;:NEXT:BX=6
6Ø BC=INT(RND(Ø)*15)+2
7Ø BY=INT(RND(Ø)*2Ø)+1:POKE 646,BC:PRINT CU
   $
8Ø FOR BAR=1TOBY:PRINT TAB(BX)BW$CU$:NEXT:P
   RINT"{CTRL 1}"
9Ø FOR CD=1TOBY:PRINT TAB(BX+2)"{CTRL J}":N
   EXT:BX=BX+3:IFBX<36 THEN 6Ø
1ØØ PRINT"{HOME}REPEAT DEMO (Y/N)?"
11Ø GET A$:IF A$="Y"THEN 3Ø
12Ø IF A$="N"THEN PRINT"{SHFT CLR}":END
13Ø GOTO11Ø
```

Joseph R. Charnetski
Dallas, PA

$3D0 C-64 screen eraser—My subroutine adds a touch of magic to any Basic program by erasing the screen from four directions in a sequence that starts at the edge of the screen and erases toward the center. The more characters it has to erase, the more visually attractive is the effect.

Our Customers Agree

CARTRIDGE PORT EXPANSION $19.95
'LBow™
For C-64 and C-128
- Allows one cartridge on the top, plus a port in the back for hardware access.
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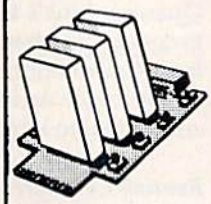

APROSPAND-64 $29.95

Give your C64 or 128 full expandability. This skillfully designed expansion unit plugs into the cartridge port, this gives you 4 switchable (single or in combination) cartridge slots, includes fuse protection and a reset button!

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Drive/printer 6 ft. 6 pin male to male	B66	$ 6.95
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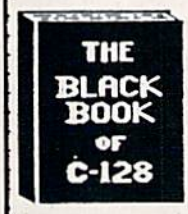
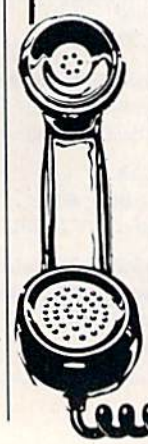
Drive/printer 18 ft. 6 pin male to male	B618	$16.95
Drive/printer 9 ft. 6 pin rt. angle male/male	RA69	$ 9.95
Drive/printer ext. 6 ft. 6 pin male to female	A66	$ 6.95
Monitor 6 ft. 5 pin to 4 RCA plugs	M654	$ 9.95
Monitor 6 ft. 5 pin to 2 RCA plus	M652	$ 6.95
Monitor ext. 6 ft. 5 pin male to female	ME65	$ 6.95
Joystick extension 12 ft. male to female	JS12	$ 7.95
Joystick Y, 1 male to 2 female	JSY	$ 8.95
Power cable, 6 ft. male to right angle female	PR6	$ 9.95
Centronics 6 ft. 36 pin male to male	C6MM	$14.95
Centronics 6 ft. 36 pin male to female	C6MF	$14.95
Centronics 10 ft. 36 pin male to male	C10M	$19.95
RS-232 6 ft. 25 pin male to male	R6MM	$14.95
RS-232 6 ft. 25 pin male to female	R6MF	$14.95
IBM printer 6 ft. 36 pin/DB25 male to male	IBMP	$14.95



BLACK BOOK of C128 $15.95

The best friend a C128 owner ever had...Includes C-64, C-128, CPM 3.0, 1541, 1571 disk drives. 261 pages, each chapter color coded for fast reference, 75 easy to read charts and tables, understandably written. The Black Book of C-128 is very much like a dictionary, always ready to answer your questions.



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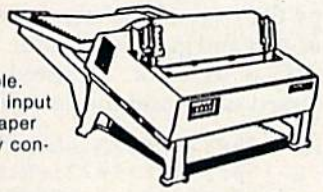
BUILT-IN SWITCH

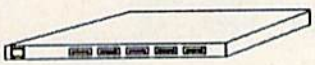
One cable for both 40 or 80 column, flip a switch for your choice. Plugs to the back of the monitor for a clearer picture. Display is full 16 colors in 40 colums mode or monochrome in 80 columns. Not for use with RGB monitor or TV sets.

PRINTER STAND $19.95



Save space, totally adjustable. Fits all width printers. Store input paper beneath, removable paper tray, totally universal, sturdy construction, lifetime warranty.

POWER CENTERS $59.95



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Commodore 1571 disk drive	$19.95
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SAM'S BOOKS

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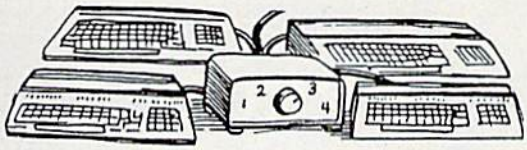

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Our AB switches allow you to share equipment rather than buy costly duplicates. Many configurations may be arranged, two computers to one disk drive and printer, or two printers to one computer. No need to ever plug and unplug cables again, just turn a knob to switch from one peripheral to another. Below are the types we have in stock, remember if you need extra cables, we carry a large selection.

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Circle 300 on Reader Service card.

Magic

```
1Ø REM 64 SCREEN ERASER-CHRIS CHARNETSKI
2Ø H$=CHR$(19):S$=" ":V$=S$
3Ø FOR A=1TO23:V$=V$+CHR$(157)+CHR$(17)+S$:
   NEXT:V$=V$+H$
4Ø FOR A=ØTO12:PRINT H$;TAB(A)V$:POKE781,A:
   SYS599Ø3
5Ø PRINT H$;TAB(39-A)V$:POKE781,24-A:SYS599
   Ø3:NEXT:SYS58692:REM RETURN
```

Christine N. Charnetski
Plains, PA

$3D1 Easy C-64 border—My short program prints a border on the C-64 screen. Because the program uses Pokes to print the border characters, the border can occupy the edge of the screen, leaving a maximum area for your text and graphics. In line 10, S is the border character and C is its color. As listed, the border character is a reversed space and the color is white.

```
Ø REM EASY BORDER-ANDREW D RILEY
1Ø S=16Ø:C=1:L=1Ø23:PRINT"{SHFT CLR}{CTRL 2
   }":POKE5328Ø,Ø:POKE53281,Ø
2Ø FOR Z=1TO4:READX,Y:FOR I=1TOX:L=L+Y:POKE
    L+54272,C:POKE L,S:NEXT:NEXT
3Ø DATA 4Ø,1,24,4Ø,39,-1,23,-4Ø
```

Andrew D. Riley
Camden, OH

$3D2 Ultra hi-res helper—The Ultra Hi-Res Graphics program from the February 1986 issue of *RUN* is fantastic, but trying to draw at the right locations can be a real problem. The Ultra Hi-Res Helper routine to the rescue!

Place the Helper at the end of the Draw statements in your program. When you run your program, use the keypad to move the dot you see on the screen to the location you want, then press the plus key, and the current X and Y locations will be printed on the screen. You can then move to another location and press the plus key again. When you've located all the points, press the minus key to exit the program. If your program already has an error trap at 10000, you can leave out line 10000.

```
1 REM ULTRA HI RES HELPER-J. W. JARVIS
1ØØØ X=32Ø:Y=1ØØ
1ØØ2 @DOT,X,Y,1:GETKEY K$:K=VAL(K$)
1ØØ4 IFK$="+"THEN L$="X="+STR$(X)+" Y="+STR
     $(Y):@CHAR,53248,2ØØ,1ØØ,1,1,L$
1ØØ6 IFK$="-"THEN 1ØØØØ
1ØØ8 IF K=5 OR K=ØTHEN1ØØ2:ELSE @DOT,X,Y,Ø
1Ø1Ø IFK=2 THEN Y=Y+1
1Ø12 IFK=8 THEN Y=Y-1
1Ø14 IFK=4 THEN X=X-1
1Ø16 IFK=6 THEN X=X+1
1Ø18 IFK=7 THEN X=X-1:Y=Y-1
1Ø2Ø IFK=9 THEN X=X+1:Y=Y-1
1Ø22 IFK=3 THEN X=X+1:Y=Y+1
1Ø24 IFK=1 THEN X=X-1:Y=Y+1
1Ø26 GOTO 1ØØ2
1ØØØØ @TEXT:HELP:END
```

Jerry W. Jarvis
Spokane, WA

$3D3 Easy eye-catcher—For our users group's computer fair, I altered the White Hole trick ($358, November 1986), which prints messages on the screen, to generate a continuous display timed by a For-Next loop. It works on both the C-64 and C-128. I made the following changes to the trick:

```
5 PRINT"{SHIFT CLEAR}
60 FOR X = 1TO3500:NEXT
70 GOTO 5
```

I then used lines 30–50 for the message. Extra lines can be added to allow several screens of text. The display is easy to write and a real attention-getter!

Harry A. Tellier
Denton, NC

$3D4 C-128 sprites in ML—As programmers are well aware, programming sprites in machine language on the C-128 can be a headache. To gain complete control over the sprites and sound, consult *C-128 Internals*, published by Abacus Software (Book 1 in its 128 series). It provides the information you need. Just turn off bit 0 of location $0A04 (2564), and the Basic sprite and sound IRQ will be ignored. Be sure to store the sprite image in a safe location in the C-128. The cassette buffer is at $0B00, and the area in $1300–$1BFF is free for programming use.

Jim Borden
Carlisle, PA

$3D5 Permanent marker—I find that the best pen for writing on disk labels and many other surfaces is a Resist ink pen. These pens have a porous tip like a felt-tip marker, but the ink is a special lacquer used for drawing on copper-clad circuit boards prior to etching. It's waterproof, smudgeproof and will even write on impossible surfaces like glass and enamel.

Most electronics supply stores carry them under the GC brand. You might also find them in department stores as a laundry marker under the Sharpie brand name.

Dean R. Kazmierczak
North Tonawanda, NY

$3D6 Typing from right to left on your C-64—I've written a subroutine for my Hebrew tutor programs so the user can type in text from right to left. For entering Hebrew or any language that reads from right to left, this routine is a must. It might also be helpful for certain games.

```
499 REM TYPING RIGHT-LEFT SUB-R.M. HARRIS
5ØØ PRINT CHR$(147):RO=Ø:CL=39
51Ø GET V$:IF V$=""THEN51Ø
52Ø IFV$="{COMD X}"THEN RETURN:REM EXIT
53Ø POKE781,RO:POKE782,CL
54Ø POKE783,Ø:SYS 6552Ø
55Ø PRINT V$;
56Ø CL=CL-1:IFCL<ØTHENCL=39:RO=RO+1
57Ø GOTO51Ø
```

Richard M. Harris
Seattle, WA■

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Circle 96 on Reader Service card.

From p. 69.

```
3606 PRINT#PF,LEFT$(S$,2)+CLM$;
                          :REM*118
3608 NEXTJ                :REM*130
3610 GOSUB4034            :REM*120
3612 GOSUB3618:PL=PL+3    :REM*202
3614 RETURN               :REM*102
3616 REM----PRINT DASHED LINE
                          :REM*188
3618 FORJ=1TOPW:PRINT#PF,"-";:NE
     XTJ:GOSUB4034:RETURN :REM*2
3620 REM----PRINT FILE DATA
                          :REM*236
3622 FORJ=1TONC:BUF(J)=0:NEXTJ:K
     =K+1:J=1             :REM*208
3624 PC(NC+1)=PW+3:CW=PC(2)-2-PC
     (1)                  :REM*124
3626 GOSUB3740            :REM*14
3628 GOSUB3708            :REM*146
3630 IFPC(1)>1THEN3636    :REM*170
3632 PRINT#PF,CLM$;       :REM*132
3634 GOTO3638             :REM*216
3636 PRINT#PF,LEFT$(S$,PC(1)-1)+
     CLM$;                :REM*166
3638 FORJ=2TONC           :REM*164
3640 CW=PC(J+1)-2-PC(J)   :REM*240
3642 GOSUB3740            :REM*30
3644 GOSUB3708            :REM*162
3646 PRINT#PF,LEFT$(S$,2)+CLM$;
                          :REM*158
3648 NEXTJ                :REM*170
3650 GOSUB4034            :REM*160
3652 PL=PL+1              :REM*200
3654 REM----CHECK # LINES ON PAG
     E                    :REM*16
3656 IFPL=60THENFORJ=1TO5:GOSUB4
     034:NEXTJ:PL=0:GOTO3659
                          :REM*86
3658 RETURN               :REM*146
3659 PG=PG+1:PRINT#PF,"PAGE"PG:G
     OSUB3584:GOTO3658    :REM*21
3660 REM----PRINT TOTALS/AVERAGE
     S                    :REM*174
3662 GOSUB3618:IFTL=0THENRETURN
                          :REM*122
3664 J=1:CW=PC(2)-2-PC(1)
                          :REM*188
3666 IFTA=0THENGOSUB3722:GOSUB39
     18:GOTO3674          :REM*240
3668 GOSUB3732            :REM*152
3670 IFC$(J,13)="N"THENGOSUB3918
     :GOTO3674            :REM*84
3672 GOSUB3708            :REM*190
3674 IFPC(1)>1THEN3680    :REM*246
3676 PRINT#PF,CLM$;       :REM*176
3678 GOTO3682             :REM*36
3680 PRINT#PF,LEFT$(S$,PC(1)-1)+
     CLM$;                :REM*210
3682 FORJ=2TONC           :REM*208
3684 CW=PC(J+1)-2-PC(J)   :REM*28
3686 IFTA=0THENGOSUB3722:GOSUB39
     18:GOTO3694          :REM*4
3688 GOSUB3732            :REM*172
3690 IFC$(J,13)="N"THENGOSUB3918
     :GOTO3694            :REM*108
3692 GOSUB3708            :REM*210
3694 PRINT#PF,LEFT$(S$,2)+CLM$;
                          :REM*206
3696 NEXTJ                :REM*218
3698 GOSUB4034            :REM*208
3700 IFTA=0THENTA=1:GOTO3662
                          :REM*30
3702 GOSUB3618            :REM*236
3704 RETURN               :REM*192
3706 REM---DETERMINE JUSTIFICATI
     ON                   :REM*240
3708 IFLEFT$(C$(J,0),1)="L"THENG
     OSUB3926:RETURN      :REM*72
3710 IFLEFT$(C$(J,0),1)="R"THENG
     OSUB3918:RETURN      :REM*214
3712 IFE=1THENGOSUB3918:RETURN
                          :REM*138
3714 IFLEFT$(C$(J,0),1)="C"THENG
     OSUB3904:RETURN      :REM*56
3716 IFLEFT$(C$(J,0),1)="D"THENG
     OSUB3906:RETURN      :REM*62
3718 GOSUB3934:RETURN     :REM*24
3720 REM---DETERMINE TOTAL/AVG L
     ABEL FOR COLUMN      :REM*114
3722 IFLEFT$(C$(J,13),1)="N"THEN
      CLM$="":RETURN      :REM*132
3724 IFLEFT$(C$(J,13),1)="T"THEN
      CLM$="TOTAL":RETURN
                          :REM*124
3726 IFCW<7THENCLM$="AVG":RETURN
                          :REM*122
3728 CLM$="AVERAGE":RETURN
                          :REM*114
3730 REM---DETERMINE TOTAL/AVG V
     ALUE FOR COLUMN      :REM*190
3732 IFLEFT$(C$(J,13),1)="N"THEN
      CLM$="":RETURN      :REM*142
3734 IFLEFT$(C$(J,13),1)="T"THEN
      CLM$=STR$(SUM(J)):RETURN
                          :REM*48
3736 IFK<>0THENCLM$=STR$(SUM(J)/
     K)                   :REM*188
3737 RETURN               :REM*225
3738 REM---DETERMINE CONTENTS OF
      COLUMN              :REM*178
3740 IFLEFT$(C$(J,1),1)="#"THEN
     CLM$=STR$(I):GOTO3792
                          :REM*34
3742 IFLEFT$(C$(J,1),1)="F"THEN
     CLM$=REC$(VAL(MID$(C$(J,1),
     2,2))):GOTO3792      :REM*140
3743 IFLEFT$(C$(J,1),1)="R"THEN
```

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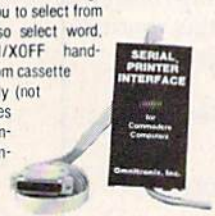

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```
    CLM$=STR$(SUM(VAL(MID$(C$(J
    ,1),2,2)))):GOTO3792
                          :REM*189
3744 REM----CALCULATIONS ROUTINE
                          :REM*240
3746 RES=0:EQ=0           :REM*14
3748 EQ=EQ+2              :REM*2
3750 REM----OPERAND X     :REM*120
3752 IFLEFT$(C$(J,EQ),1)="F"THEN
      X=VAL(REC$(VAL(MID$(C$(J,E
    Q),2,2)))):GOTO3762:REM*110
3753 IFC$(J,EQ+1)="++"THEN X=VAL
    (MID$(C$(J,2),2,2)):GOTO376
    2                     :REM*231
3754 IFLEFT$(C$(J,EQ),1)="C"THEN
      X=BUF(VAL(MID$(C$(J,EQ),2,
    2))):GOTO3762         :REM*160
3756 IFLEFT$(C$(J,EQ),3)="RES"TH
    EN X=RES:GOTO3762     :REM*200
3758 IFLEFT$(C$(J,EQ),2)="PI"THE
    N X=PI:GOTO3762       :REM*146
3760 IFLEFT$(C$(J,EQ),1)<>"."THE
    N X=VAL(C$(J,EQ))     :REM*20
3762 EQ=EQ+2              :REM*16
3764 REM----OPERAND Y     :REM*198
3766 IFLEFT$(C$(J,EQ),1)="F"THEN
      Y=VAL(REC$(VAL(MID$(C$(J,E
    Q),2,2)))):GOTO3776:REM*222
3767 IFC$(J,EQ-1)="++"THEN Y=VAL
    (MID$(C$(J,4),2,2)):GOTO377
    6                     :REM*167
3768 IFLEFT$(C$(J,EQ),1)="C"THEN
      Y=BUF(VAL(MID$(C$(J,EQ),2,
    2))):GOTO3776         :REM*242
3770 IFLEFT$(C$(J,EQ),3)="RES"TH
    EN Y=RES:GOTO3776     :REM*96
3772 IFLEFT$(C$(J,EQ),2)="PI"THE
    N Y=PI:GOTO3776       :REM*34
3774 Y=VAL(C$(J,EQ))      :REM*40
3776 GOSUB3800            :REM*52
3778 IFC$(J,EQ+1)<>"Y"ORE=1THEN3
    788                   :REM*146
3780 RES=Z                :REM*104
3782 IFEQ=12THEN3788      :REM*46
3784 GOTO3748             :REM*158
3786 REM----SET VALUE OF COLUMN/
    BUFFERS               :REM*234
3788 IFE=1THENCLM$="??ERROR??":G
    OTO3792               :REM*154
3790 CLM$=STR$(Z)         :REM*50
3792 BUF(J)=VAL(CLM$)     :REM*38
3794 SUM(J)=SUM(J)+VAL(CLM$)
                          :REM*132
3796 RETURN               :REM*28
3798 REM----BASIC MATH OPERATORS
                          :REM*88
3800 W=EQ-1               :REM*218
3802 E=0:Z=0:C$=C$(J,W)   :REM*160
3804 IFC$(J,W)="+"THEN Z=X+Y:RET
    URN                   :REM*2
3805 IFC$(J,W)="++"THEN Z=0:FORH
    =XTOY:Z=Z+BUF(H):NEXTH:RETU
    RN                    :REM*119
3806 IFC$(J,W)="-"THEN Z=X-Y:RET
    URN                   :REM*40
3807 IFC$(J,W)="*"THEN Z=X*Y:RET
    URN                   :REM*253
3808 IFC$(J,W)="/"ANDY<>0THEN Z=
    X/Y:RETURN            :REM*128
3809 IFC$(J,W)="{UP ARROW}"THEN
    Z=X{UP ARROW}Y:RETURN
                          :REM*75
3810 IFC$(J,W)="SGN"THEN Z=Y*(-1
    ):RETURN              :REM*140
3811 REM----LOGICAL OPERATORS
                          :REM*223
3812 IFC$(J,W)="="ANDX=YTHENZ=1:
    RETURN                :REM*220
3813 IFC$(J,W)="<"ANDX<YTHENZ=1:
    RETURN                :REM*207
3814 IFC$(J,W)=">"ANDX>YTHENZ=1:
    RETURN                :REM*238
3815 IFC$(J,W)="<>"ANDX<>YTHENZ=
    1:RETURN              :REM*81
3816 IFC$(J,W)="OR"AND(X>1ORY>1)
    THENZ=1:RETURN        :REM*48
3817 IFC$(J,W)="AND"ANDX>1ANDY>1
    THENZ=1:RETURN        :REM*183
3818 IFC$="="ORC$="<"ORC$=">"ORC
    $="<>"ORC$="OR"ORC$="AND"TH
    ENZ=0:RETURN          :REM*76
3819 REM----SCIENTIFIC OPERATORS
                          :REM*101
3820 IFC$(J,W)="SQR"ANDY>=0THEN
    Z=SQR(Y):RETURN       :REM*148
3821 IFC$(J,W)="SIN"THEN Z=SIN(Y
    ):RETURN              :REM*135
3822 IFC$(J,W)="COS"THEN Z=COS(Y
    ):RETURN              :REM*126
3824 IFC$(J,W)="TAN"ANDCOS(Y)<>0
    THEN Z=TAN(Y):RETURN
                          :REM*196
3826 IFC$(J,W)="ATN"THEN Z=ATN(Y
    ):RETURN              :REM*218
3828 IFC$(J,W)="ABS"THEN Z=ABS(Y
    ):RETURN              :REM*130
3830 IFC$(J,W)="LOG"ANDY>0THEN Z
    =LOG(Y):RETURN        :REM*6
3832 IFC$(J,W)="EXP"ANDABS(Y)<88
    THEN Z=EXP(Y):RETURN
                          :REM*188
3834 IFC$(J,W)="INT"THEN Z=INT(Y
    ):RETURN              :REM*196
3836 IFC$(J,W)="SEC"ANDCOS(Y)<>0
    THEN Z=1/COS(Y):RETURN
                          :REM*156
3838 IFC$(J,W)="CSC"ANDSIN(Y)<>0
    THEN Z=1/SIN(Y):RETURN
                          :REM*128
3840 IFC$(J,W)="COT"ANDTAN(Y)<>0
    THEN Z=1/TAN(Y):RETURN
                          :REM*107
3842 IFC$(J,W)="ASN"AND(-Y*Y+1)>
    0THEN Z=ATN(Y/SQR(-Y*Y+1)):
    RETURN                :REM*191
3844 IFC$(J,W)="ACO"AND(-Y*Y+1)>
    0THEN Z=-ATN(Y/SQR(-Y*Y+1))
    +PI/2:RETURN          :REM*11
3846 IFC$(J,W)="ASC"AND(Y*Y-1)>0
    THEN Z=ATN(Y/SQR(Y*Y-1)):RE
    TURN                  :REM*101
3848 IFC$(J,W)="ACS"AND(Y*Y-1)>0
    THEN Z=ATN(Y/SQR(Y*Y-1))+(S
    GN(Y)-1*PI/2):RETURN:REM*57
3850 IFC$(J,W)="ACT"THEN Z=ATN(Y
    )+PI/2:RETURN         :REM*157
3852 IFC$(J,W)="INV"ANDY<>0THEN
    Z=1/Y:RETURN          :REM*51
3854 REM----CONVERSIONS   :REM*25
3856 IFC$(J,W)="RAD"THEN Z=Y*PI/
    180:RETURN            :REM*87
3858 IFC$(J,W)="DEG"THEN Z=Y*180
    /PI:RETURN            :REM*227
3860 IFC$(J,W)="INS"THEN Z=Y/25.
    4:RETURN              :REM*1
3862 IFC$(J,W)="MMS"THEN Z=Y*2
    4:RETURN              :REM*143
3864 IFC$(J,W)="DFR"THEN Z=Y*9/5
    +32:RETURN            :REM*17
3866 IFC$(J,W)="DCG"THEN Z=(Y-32
    )*5/9:RETURN          :REM*23
3868 IFC$(J,W)="GMS"THEN Z=Y/.03
    536:RETURN            :REM*81
3870 IFC$(J,W)="OZS"THEN Z=Y*.03
    536:RETURN            :REM*101
3872 IFC$(J,W)="LBM"THEN Z=Y*2.2
    1:RETURN              :REM*229
3874 IFC$(J,W)="KGM"THEN Z=Y/2.2
    1:RETURN              :REM*135
3876 IFC$(J,W)="LBF"THEN Z=Y*4.4
    48:RETURN             :REM*135
```

→

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Sign Here _____

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Listing 1 continued.

```
3878 IFC$(J,W)="NWF"THEN Z=Y*.22
     48:RETURN              :REM*139
3880 IFC$(J,W)="MLS"THEN Z=Y/1.6
     09344:RETURN           :REM*17
3882 IFC$(J,W)="KMS"THEN Z=Y*1.6
     09344:RETURN           :REM*3
3884 IFC$(J,W)="FPS"THEN Z=Y*.30
     48:RETURN              :REM*177
3886 IFC$(J,W)="MPS"THEN Z=Y/.30
     48:RETURN              :REM*51
3888 IFC$(J,W)="PSI"THEN Z=Y*6.8
     95{UP ARROW}3:RETURN
                            :REM*103
3890 IFC$(J,W)="NSM"THEN Z=Y/6.8
     95{UP ARROW}3:RETURN:REM*89
3892 REM IFC$(J,W)="FN1"THEN Z=Y
     {11 SPACEs}:RETURN:REM USER
      DEFINED FUNCTION 1:REM*245
3894 REM IFC$(J,W)="FN2"THEN Z=Y
     {11 SPACEs}:RETURN:REM USER
      DEFINED FUNCTION 2:REM*121
3896 REM IFC$(J,W)="FN3"THEN Z=Y
     {11 SPACEs}:RETURN:REM USER
      DEFINED FUNCTION 3:REM*253
3898 PRINT" {COMD 3}INVALID PARA
     METER{CTRL 8}{CRSR UP}":Z=0
     :E=1                   :REM*107
3900 RETURN                 :REM*133
3902 REM----CURRENCY/DECIMAL/RIG
     HT JUSTIFICATION       :REM*241
3904 R=2:GOTO3908           :REM*17
3906 R=VAL(MID$(C$(J,0),2))
                            :REM*39
3908 CLM$=STR$(INT(VAL(CLM$)*10{
     UP ARROW}R+.5))        :REM*43
3910 IFLEFT$(CLM$,1)=" "THENCLM$
     =MID$(CLM$,2)          :REM*47
3912 IFR>LEN(CLM$)THENCLM$=RIGHT
     $("00000000"+CLM$,R)
                            :REM*125
3914 IFRTHENCLM$=LEFT$(CLM$,LEN(
     CLM$)-R)+"."+RIGHT$(CLM$,R)
                            :REM*149
3916 REM----RIGHT JUSTIFY:REM*21
3918 IFLEN(CLM$)<CWTHENCLM$=RIGH
     T$(S$+CLM$,CW)         :REM*205
3920 IFLEN(CLM$)>CWTHENCLM$=LEFT
     $(CLM$,CW)             :REM*37
3922 RETURN                 :REM*155
3924 REM----LEFT JUSTIFICATION
                            :REM*65
3926 IFLEN(CLM$)<CWTHENCLM$=CLM$
     +LEFT$(S$,CW-LEN(CLM$))
                            :REM*115
3928 IFLEN(CLM$)>CWTHENCLM$=LEFT
     $(CLM$,CW)             :REM*45
3930 RETURN                 :REM*163
3932 REM----PERCENT/RIGHT JUSTIF
     ICATION                :REM*105
3934 CLM$=STR$(VAL(CLM$)*100)
                            :REM*159
3936 GOTO3906               :REM*87
3938 REM----DIRECTORY       :REM*141
3940 PRINT"{SHFT CLR}{CTRL 8}";:
     @"$":PRINTTAB(25)"{COMD 6}P
     RESS {CTRL 2}{CTRL 9}ANY KE
     Y{CTRL 0}{CTRL 8}":GOSUB3018
     8:RETURN               :REM*101
```

```
3998 REM----SETUP FOR PRINTER
                            :REM*241
4000 PRINT"{SHFT CLR}{CTRL 8} {C
     TRL 9}{5 SPACEs}CALCULATED
     REPORTS PROGRAM{7 SPACEs}"
                            :REM*253
4002 PRINT" {CTRL 9}{2 SPACEs}PR
     INTER OR INTERFACE CONFIGUR
     ATION{2 SPACEs}"       :REM*233
4003 PRINT"{CRSR DN}{COMD 6} CUR
     RENT OPTION IS:{CTRL 8}"P
                            :REM*164
4004 PRINT"{CRSR DN}{COMD 6} PRE
     SS {CTRL 9}{CTRL 2}1{COMD 6
     }{CTRL 0}{2 SPACEs}CARDCO A
     , 1525                 :REM*139
4006 PRINT"{7 SPACEs}{CTRL 9}{CT
     RL 2}2{COMD 6}{CTRL 0}{2 SP
     ACEs}PRINTERS W/GRAPHIC INT
     ERFACES"               :REM*101
4008 PRINT"{7 SPACEs}{CTRL 9}{CT
     RL 2}3{COMD 6}{CTRL 0}{2 SP
     ACEs}1526, MPS801/802/803"
                            :REM*11
4009 PRINT"{7 SPACEs}{CTRL 9}{CT
     RL 2}4{COMD 6}{CTRL 0}{2 SP
     ACEs}PRINT TO SCREEN"
                            :REM*12
4010 IFP<>0THENPRINT"{2 CRSR DNs
     }{3 SPACEs}OR{2 SPACEs}{CTR
     L 9}{CTRL 2}S{COMD 6}{CTRL
     0}END PRINTER COMMANDS"
                            :REM*213
4012 IFP<>OTHENPRINT"{CRSR DN}{7
      SPACEs}{CTRL 9}{CTRL 2}E{C
     OMD 6}{CTRL 0}XIT TO CONTIN
     UE"                    :REM*135
4014 PRINT"{2 CRSR DNs}{CTRL 8}
     {CTRL 9}{6 SPACEs}PRESS THE
      APPROPRIATE KEY{6 SPACEs}"
                            :REM*5
4016 GETA$:IFA$=""THEN4016
                            :REM*89
4018 IFA$="E"THENPRINT"{SHFT CLR
     }CLEARING...":RETURN:REM*41
4020 IFA$="S"THEN4044       :REM*83
4022 P=VAL(A$):PF=4         :REM*37
4024 IFP=1THENB1$=CHR$(10):GOTO4
     000                    :REM*73
4026 IFP=2THENB1$=CHR$(0):GOTO40
     00                     :REM*161
4028 IFP=3THENB1$=CHR$(0):GOTO40
     00                     :REM*195
4029 IFP=4THENB1$=CHR$(0):PF=3:G
     OTO4000                :REM*120
4030 GOSUB602:GOTO4016      :REM*91
4032 REM----PRINT TERMINATOR
                            :REM*23
4034 ONPGOTO4036,4038,4040,4038
                            :REM*139
4036 PRINT#PF,B1$;:RETURN
                            :REM*191
4038 PRINT#PF,B1$:RETURN:REM*157
4040 PRINT#PF:RETURN        :REM*11
4042 REM----PRINTER COMMANDS
                            :REM*81
4044 PRINT"{SHFT CLR} {CTRL 8}{C
     TRL 9}{11 SPACEs}PRINTER CO
     MMAND{12 SPACEs}{CTRL 0}"
```

Circle 24 on Reader Service card.

```
                              :REM*221
4Ø46 PRINT"{CRSR DN}{COMD 6} THI
     S ROUTINE WILL SEND CHARACT
     ER"                      :REM*131
4Ø48 PRINT" STRING [CHR$()] COMM
     ANDS TO AN ASCII"  :REM*2Ø3
4Ø5Ø PRINT" PRINTER.{2 SPACEs}CO
     MMANDS MUST BE ENTERED IN"
                              :REM*149
4Ø52 PRINT" THE FORM OF INTEGERS
      SUCH AS:"          :REM*239
4Ø54 PRINT"{CRSR DN}{CTRL 8} ? 2
     7{COMD 6}{5 SPACEs}(ESCAPE
     CODE)"                   :REM*111
4Ø56 PRINT" {CTRL 8}? 66{COMD 6}
     {5 SPACEs}(PITCH CODE)"
                              :REM*15
4Ø58 PRINT" {CTRL 8}? 2{COMD 6}{
     6 SPACEs}(COMPRESSED MODE)"
                              :REM*145
4Ø6Ø PRINT" {CTRL 8}? *{COMD 6}{
     6 SPACEs}(END THE SEQUENCE)
     "                        :REM*31
4Ø62 PRINT"{CRSR DN} THIS WILL B
     E SENT TO THE PRINTER AS:"
                              :REM*17
4Ø64 PRINT"{CRSR DN}{3 SPACEs}{C
     TRL 8}PRINT#4,CHR$(27)CHR$(
     66)CHR$(2){COMD 6}":REM*141
4Ø66 PRINT"{CRSR DN} UP TO FOUR(
     4) NUMBERS MAY BE SENT,"
                              :REM*251
4Ø68 PRINT" THE FIRST NORMALLY B
     EING {CTRL 9}{CTRL 8}27{COM
     D 6}{CTRL Ø}, THE" :REM*187
4Ø7Ø PRINT" ESCAPE CHARACTER.{2
     SPACEs}END THE SEQUENCE"
                              :REM*175
4Ø72 PRINT" BY PRESSING {CTRL 9}
     {CTRL 2}RETURN{COMD 6}{CTRL
      Ø} WHEN THE ASTERISK"
                              :REM*73
4Ø74 PRINT" IS SHOWING.{2 SPACEs
     }PRINTERS WILL VARY, SO"
                              :REM*179
4Ø76 PRINT" CHECK YOUR MANUAL FO
     R THE CODES."            :REM*15
4Ø78 PRINT"{CRSR DN}{4 SPACEs}{C
     TRL 2}{CTRL 9}ANY KEY{COMD
     6}{CTRL Ø} TO CONTINUE OR {
     CTRL 9}{CTRL 2}E{COMD 6}{CT
     RL Ø}XIT?{CTRL 8}" :REM*151
4Ø79 GETA$:IFA$=""THEN4Ø79
                              :REM*16Ø
4Ø8Ø IFA$="E"THENRETURN :REM*165
4Ø82 PRINT"{SHFT CLR} {CTRL 8}{C
     TRL 9}{8 SPACEs}SEND PRINTE
     R COMMAND{1Ø SPACEs}{CTRL Ø
     }"                       :REM*81
4Ø84 PRINT"{CRSR DN} {COMD 6}ENT
     ER CODE, THEN PRESS {CTRL 2
     }{CTRL 9}RETURN{CTRL Ø}"
                              :REM*2Ø7
4Ø86 PRINT"{CRSR DN} {CTRL 9}RET
     URN{CTRL Ø} {COMD 6}ONLY TO
      QUIT{2 CRSR DNs}" :REM*249
4Ø88 FORI=1TO4:PRINT"{COMD 6}COD
     E{CTRL 8}";I;" ? * {4 CRSR
     LFs}";:INPUTI$(I)   :REM*95
4Ø9Ø IFI$(I)="*"THEN4Ø94 :REM*59
4Ø92 NEXTI                    :REM*95
4Ø94 ON(I-1)GOTO4Ø96,4Ø98,41ØØ,4
     1Ø2:GOTO41Ø4         :REM*63
4Ø96 PRINT#4,CHR$(VAL(I$(1))):GO
     TO41Ø4               :REM*144
4Ø98 PRINT#4,CHR$(VAL(I$(1)))CHR
     $(VAL(I$(2))):GOTO41Ø4
                              :REM*182
41ØØ PRINT#4,CHR$(VAL(I$(1)))CHR
     $(VAL(I$(2)))CHR$(VAL(I$(3)
     )):GOTO41Ø4          :REM*226
41Ø2 PRINT#4,CHR$(VAL(I$(1)))CHR
     $(VAL(I$(2)))CHR$(VAL(I$(3)
     ))CHR$(VAL(I$(4)))  :REM*14
41Ø4 PRINT"{2 CRSR DNs}{1Ø SPACE
     s}{CTRL 9}{CTRL 2}A{COMD 6}
     {CTRL Ø}NOTHER CODE"
                              :REM*2Ø6
41Ø6 PRINT"{CRSR DN}{1Ø SPACEs}{
     CTRL 9}{CTRL 2}T{COMD 6}{CT
     RL Ø}EST PRINTER"  :REM*1Ø2
41Ø8 PRINT"{CRSR DN}{1Ø SPACEs}{
     CTRL 9}{CTRL 2}E{COMD 6}{CT
     RL Ø}XIT TO PRINT"  :REM*64
411Ø PRINT"{CRSR DN} {CTRL 8}{CT
     RL 9}{6 SPACEs}PRESS THE AP
     PROPRIATE KEY{7 SPACEs}"
                              :REM*146
4112 GETA$:IFA$=""THEN4112
                              :REM*246
4113 IFA$="A"THEN4Ø82    :REM*167
4114 IFA$="T"THENPRINT#4,"ABCDEF
     GHIJKLMNOPQRSTUVWXYZ":GOTO4
     112                      :REM*21Ø
4116 IFA$="E"THENRETURN :REM*2Ø2
4118 GOSUB6Ø2:GOTO4112   :REM*15Ø
```

■

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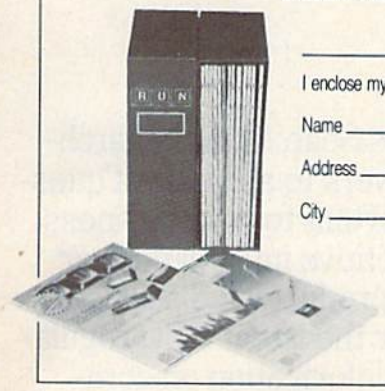

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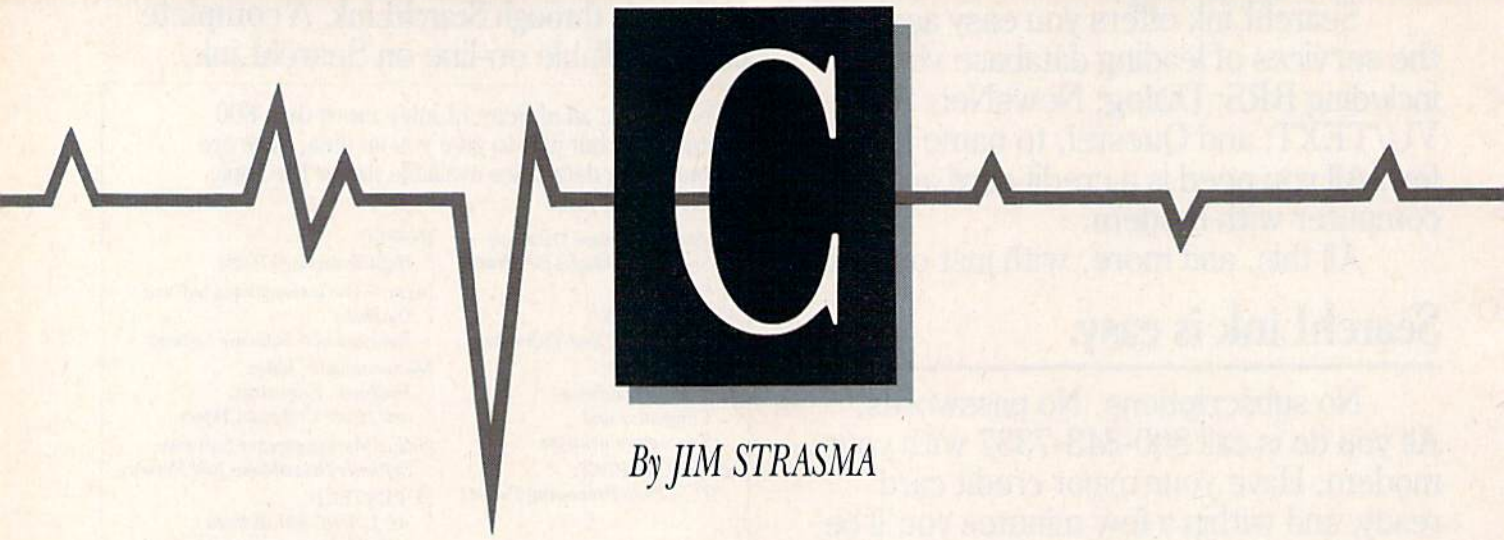

By JIM STRASMA

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question on a postcard to:

Jim Strasma
Commodore Clinic
PO Box 6100
Macomb, IL 61455

Queries are answered only through this column, and, due to the volume of mail, only questions that appeal to the majority of our readers can be published.

SOFTWARE

***Q:** I want to set up some large database files, using either Superbase 128 or a CP/M database. Someday I may change to an MS-DOS system, so I'll need to transfer all these files to an MS-DOS-compatible database. How can I be certain that I'll be able to do this when the time comes?*

Bob Stoeckley
Eureka, MT

A: Future compatibility is very difficult to guarantee in any system. Your best bet is to find a program that's offered in both CP/M and MS-DOS versions, and run the CP/M version for now.

Ashton Tate's Dbase II package is a safe choice, since the great majority of MS-DOS datafile programs are able to read Dbase files, and both Dbase II and the newer Dbase III Plus are available in MS-DOS versions. Unfortunately, Dbase II is more expensive than Superbase 128, but you can console yourself with the knowledge that it's quite easy to find skilled Dbase programmers to help you when the time comes, due to the program's 80-percent dominance of the MS-DOS database market.

***Q:** Where can I find programs to use with my 1520 printer-plotter?*

John Elberson
Bonita, CA

A: The International Commodore Products User Group (ICPUG) in England has just announced the resurrection of its 1520 user's group and the availability of a disk of programs for the 1520. You can order the disk from W. G. C. Austin, School of Geography, Faculty of Humanities, Newcastle Polytechnic, Lipman Building, Sandyford Road, Newcastle-Upon-Tyne, NE1 8ST England. The asking price is a disk with a program for the 1520 on it, together with return packaging and money for postage. You might also offer to join ICPUG.

***Q:** On page 69 in the May 1986 issue of* RUN, *line 240 of the Basic loader listing has the same REM value, 34, as line 690 in the Numeric Keypad listing on page 60 of the March 1986 issue. However, the data in each is different. How can this be?*

R. H. Williams
Albany, GA

A: Notice that all the checksum values for Perfect Typist are in the range 0–255. This is a single-byte checksum, and easy to calculate in machine language. It's also good enough for most needs, since the odds of an incorrectly typed program line having the correct checksum are only 1 in 256. However, as you noticed, it is possible for two dissimilar lines to have the same checksum. If that ever becomes a problem, using a two-byte checksum would decrease the odds of an error to 1 in 65,536, but at the cost of a slightly more complicated checksum algorithm. For now, let's stick with the one-byte version.

HARDWARE

***Q:** An "authorized" Commodore dealer told us that Commodore hardware we purchase from any other outlet is not subject to the same quality-control monitoring as the products purchased from him. Aren't consumers who purchase their hardware through retail outlets such as K-Mart and Sears receiving equipment that's just as good?*

Jane Palenske
Manhattan, KS

A: I expect your dealer is doing his own quality-control testing on the computers he sells, as do several other authorized Commodore dealers I've known over the years. This typically consists of setting up each system and running diagnostic programs on it for a day or two before putting it up for sale, which is about the same testing Commodore gives its computers before they leave the factory. The value of the added testing by the

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dealer is that he's likely to catch problems that may have developed during shipping or that weren't caught in the factory.

Although this added testing costs the dealer and you extra, I highly recommend it, because it improves your chances of receiving a reliable system. Even when I buy from a discount store, I always set up the hardware and test it before taking it home.

As far as I know, chain stores receive computers that are as well tested as those sent to independent dealers. Commodore is well aware that the chain stores are among its most important outlets, and several of them have refund policies that would cost Commodore a bundle if it shipped them faulty equipment.

Q: Are the 1525, 1526, MPS-801 and MPS-803 all different printers or just two printers with different names?

Michael Spink
Bridgeport, WV

A: The 1525 and MPS-801 belong to one family of printers, different in appearance and some features, but sharing the same set of commands for such things as high-resolution graphics. The 1526 and MPS-803 also are similar in their commands and features, but both are quite different from the 1525 and MPS-801.

Although the 1526 and MPS-803 have some excellent features, most Commodore-compatible software is designed for the 1525 and MPS-801. This is especially true of programs that use graphics. The MPS-801 and MPS-803 are more recent and have replaced the 1525 and 1526 for the most part.

REPAIRS

Q: For some reason my MPS-802 dot matrix printer no longer prints the top row of dots for each character. I replaced the ribbon, but that didn't help. What's wrong, and how can I get it repaired?

Edward Pawluczyk
Chicago, IL

A: The problem is probably dust particles from the paper clogging the wire guide in the print head.

There are two easy ways to address the problem—one inexpensive and one costly. First, try spraying a small amount of WD-40 lubricant into the wire guide openings of the print head (the part nearest the paper). If you're lucky, this will solve the problem, at least temporarily. If that doesn't work, replace the print head.

If you're the adventurous sort, you can also try disassembling the print head and cleaning it from the inside. This is usually effective, but be careful that you don't lose any of the dozens of tiny parts.

Q: What would make a 1541 lock up and produce a File Not Found error that can't be corrected by shutting down the system?

Gene Bricker
Santa Fe, TX

A: Most likely, your 1541 is losing track of where its drive head is, which is something it does only by brute force—banging the head up to 40 times against the track 1 stop. This is possibly a side effect of running copy-protected programs, or programs that copy copy-protected programs.

When you have this problem next time, try gently inserting into the drive the cardboard that you found in the drive when you first unpacked the unit. The cardboard will often push the head back into its normal position, allowing other commands to work.

Q: For some time now my C-64 has refused to broadcast sounds that are a part of the programs I use. I took it to a computer repair store, and the staff there said the problem was a blown audio fuse. I'd like to install the fuse myself, but I haven't found a place that sells them. Can you help?

Kevin Brown
Hanceville, AL

A: First of all, find a new service center. There's only one fuse in the C-64, the power fuse, and it has nothing to do with audio. Had the fuse blown, your entire system would have ceased to work.

However, before you take your 64 to someone else, check the volume and fine-tune controls on your TV or monitor. If all you hear is silence, try a different TV or monitor with a speaker that you know is working. If

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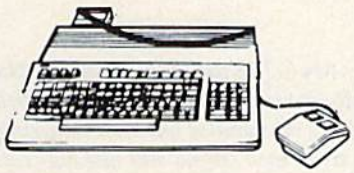

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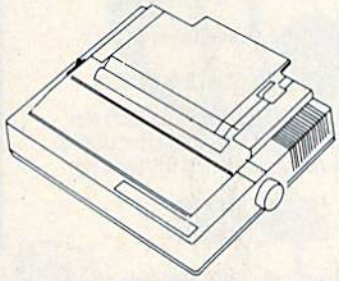

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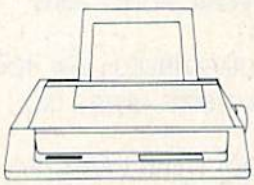

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you do get sound from that unit, then the problem is in the original TV or monitor. Otherwise, the problem is in your computer, possibly in the SID (sound interface device) chip. An authorized Commodore service center can determine this by inserting a SID chip that works.

Q: My C-128 and peripherals are plugged into a six-receptacle surge suppressor. Lately, my monitor has been flickering once or twice each second and making crackling noises. I thought it might be interference from an appliance, but turning my appliances off didn't help. I've been using my Plus/4 with the same monitor, without any flickering or crackling. Does this suggest anything?

Robert Shanfelder
Address unknown

A: Yes. It suggests that you may be overloading your surge suppressor. If the suppressor includes a noise-filtering feature, it will be limited to a specific, and often low, wattage, and color monitors, printers and modems are all power hogs. In all likelihood your C-128 is putting more of a strain on your surge suppressor than is the Plus/4.

Try plugging just the C-128 and the monitor directly into a wall socket. If the problem persists, it's either in the C-128 or its power supply and should be investigated further by an authorized Commodore service center.

PROGRAMMING

Q: Is there any way to prevent the decimal value 0.00025 from being displayed and printed in scientific notation?

Nicholas N. DiValerio
Philadelphia, PA

A: Your Commodore will display and print any number less than 0.01 in scientific notation. To prevent this you need to start by multiplying the number by whatever power of 10 it takes to convert the number to 0.01 or more. It's best to convert it into a number equal to or greater than 0.1 but less than 1.0. After multiplying, convert the portion of the new number that follows the decimal point

into a string and then concatenate the result with the correct number of preceding zeros before you print it.

In the case of 0.00025, first multiply the number by 1000 (10 to the 3rd power) to change it to 0.25, then place the result in variable X; place the power of 10 you used in the multiplication, in this case 3, in variable Y. Use Z$ to hold a supply of zeros. Your listing should look like this:

```
100 X=.25
110 Y=3
120 Z$="0.00000"
130 X$=MID$(STR$(X),3)
140 X2$=LEFT$(Z$,2+Y)+X$
150 PRINT X2$
```

If you have a C-128, use the Basic 7.0 Print Using command to format your answer. Just include in the format one pound sign (#) for each digit to be printed, plus an additional pound sign to the left of the decimal point to hold the sign of the number.

```
100 X=.00025
110 PRINT USING "##.#####";X
```

Q: According to the Commodore 64 User's Handbook, *published by Weber Systems, the program area in Basic is from address 2048 to 32767 and the cartridge ROM area is from address 32768 to 40959. Since these two areas are adjacent and both are available to RAM when no cartridge is in place, why can't you raise the end-of-Basic location so that a program and its variables can occupy the area from address 2048 to 40959?*

Glenn Parks
Washington, NJ

A: There's no reason at all why you can't use all the address range 2048–40959 for Basic programs when there's no ROM cartridge in place. In fact, that's exactly what happens automatically. When you turn on a C-64 without a cartridge installed, the system tells you that you have 38911 Basic bytes free. If you subtract 2048 from 40959, you'll get 38911, showing that both areas listed in the Weber handbook are included in the range of addresses claimed by Basic. ■

RUN *associate editor Jim Strasma teaches computer science at Western Illinois University and is a United Methodist minister. He has authored a half-dozen books and nearly a hundred articles about Commodore and IBM-PC computers.*

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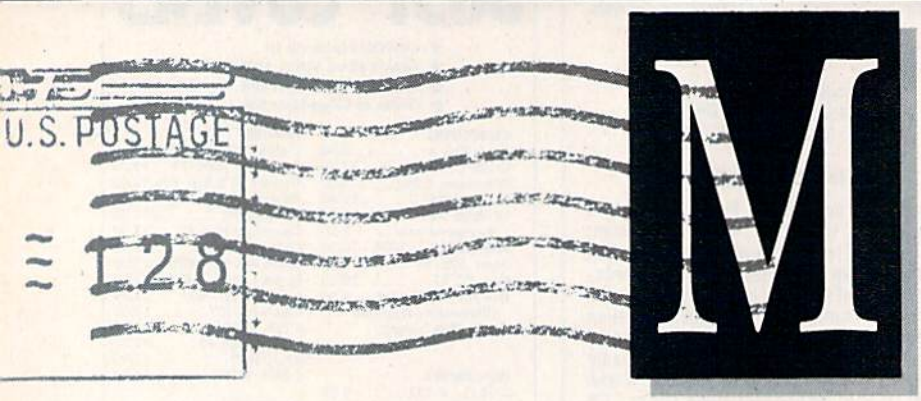

In last January's issue, in an article entitled "The Software War," we published a representative sampling of the opinions of the 50 or so Commodore user's groups and software developers who responded to RUN*'s questionnaire on copy protection of commercial programs. This article, in turn, has generated a lot of mail. This month's Mail RUN column is entirely devoted to some of the responses we've received.*

Two-Way Street

Piracy doesn't occur in just one direction. The marketing of a product that's deficient enough to make it unusable to the purchaser is also a form of thievery.

I've recently set my Commodore system aside in favor of an IBM clone. The letters and reports I send out don't look any better, but I have greater peace of mind knowing that my programs are all backed up should I have a disk mishap. I also have the convenience of being able to transfer my programs to a hard disk, and, with the shareware concept, I can actually try a program first and then pay a reasonable fee if I decide to use it.

Wayne E. Armstrong
Anaheim, CA

Hot Air

I'm an independent software retailer, and I sell mostly at hamfests and computerfests. For the last 1½ years, I've been notifying software publishers about the rampant piracy of C-64 software in my area. The feedback I get from them indicates they don't care! Of all the letters I've sent, I've received a reply from only one publisher, who said he was sorry but couldn't do anything about it. I've even contacted the FBI, but they told me as long as the holder of the copyright doesn't complain, there's nothing they can do.

A few fest promoters won't let pirates rent table space, and at these shows I'll sell about $500 worth of Commodore software. At shows where pirates are present, I'll sell $50 worth if I'm lucky.

Software publishers spend a lot of money on advertising that condemns piracy, but when it comes to actually doing something about it, they retreat. As far as I'm concerned, they're all talk!

Mike Nowowiejski
Holland, OH

Software Rambos

In our shop we use and sell several professional-grade computer-aided-design (CAD) and business graphics software packages. The first instruction in the user's manual is always to make a backup copy of all the system disks.

Now, I'm talking about software that ranges in cost from $900 to $1500. It would seem these publishers stand to lose far more from piracy than a company that puts out games and such. Every pirated copy of a CAD program means big bucks out of the publisher's coffers, not just $39.95, and the professional-level publishers are playing to a much smaller market. A handful of pirated copies can do more financial damage to such specialty publishers than several hundred pirated copies of home entertainment software can do to their manufacturers.

Still, it seems the paranoid and hostile attitude toward copying mainly emanates from the publishers of the "fun-and-games" genre of software. The concept of copy protection at this point in the evolution of small computers reflects a Rambo-like frame of mind.

Dean R. Kazmierczak
Tonawanda, NY

A Developer's Response

I've developed two programs that I market to bowling league secretaries. I customize each program to the particular league's rules and hardware and still sell it at only $50, but I've had to compile the program and embed a "fingerprint" on the disk to prevent piracy.

I offer free samples of a working program and have set the disk to permit archival copies using a particular public domain copying program, and I still get calls complaining that the disk doesn't work. Of course, as soon as I get an explanation of what's happening to the program, I know what went on. And then this same customer actually gets irate when I explain that he or she must pay the original price again to get a working program. "I just wanted to show my friend" or "I thought I could promote

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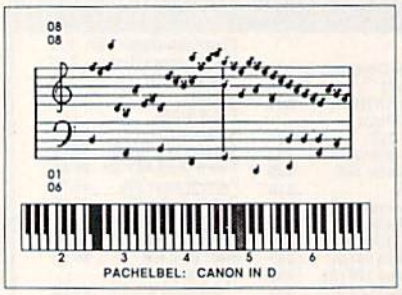

PACHELBEL: CANON IN D

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Mail RUN

another sale for you" are the usual excuses.

Often I'm labelled as a money-hungry ogre, and maybe I lose more sales with this policy than I gain, but I also feel that I don't need this type of customer.

Doug Jewell
Coquitlam, B.C., Canada

No Casualty Insurance

I'm a casualty in the copy protection war. First, the copy-protected word processor I used for three years knocked both of my 1541 disk drives out of alignment. Then five of the six programs I purchased for my C-64 in the last six months wouldn't load and run. When I called the software publishers to complain, they told me to get my drives fixed. When I said both drives had been fixed, they told me to buy a new one. They refused to give me a refund.

I came up with another solution. I purchased a different brand of computer, and I no longer buy copy-protected software.

Timothy S. Null
Annandale, VA

Copying *Promotes* Sales

Most of the programs on the market are junk. If it weren't for the availability of evaluation copies from backup copiers, far too much money would be squandered on useless, but highly advertised, garbage.

When a really good piece of software does come along, everyone who tries a backup copy and decides he wants to use the program goes out and buys his own so he can have the documentation and all. If it weren't for the evaluation copies, many of these packages wouldn't get sold because people are leery. The copies actually help sell good programs.

It appears from your article that software producers still consider backup copying the source of most of their lost sales, through a flood of illegal copies. However, backup copiers are too slow to create much of a "flood." The fact is, most illegal copies come from semi-pro programmers who are in the cottage industry of breaking protection and distributing copies for a nominal price. These copies are usually incomplete and have no documentation accompanying them.

Olin K. McDaniel, Jr.
Florence, SC

You Buy It, It's Yours!

The comment by one of the software publishers that you can't "back up" a car is completely irrelevant. That may be true, but you have the opportunity to test drive a car before purchasing it, so there's no need to try someone else's. What other product, besides computer software, is sold on a "you buy it, it's yours" basis?

Barry N. Kutner
Portsmouth, NH

Burn Ointment Needed

The majority of users who pirate software and make copies for their friends do it because they're tired of being burned by software companies. I've bought too many programs for my C-64 at $40–$50 a clip, only to be disappointed in the software performance and furious at spending my money on junk.

I know of no software store where you can buy a program, and then, if you decide it's not right for your needs, you can return the program and get your money back. Until that issue is resolved, pirating will flourish.

Leo F. Garvey
Mastic Beach, NY

The Industry Impugned

Perhaps it's true that some users and developers seek a truce in the software war, as your January 1987 issue suggests, but I take no prisoners.

First, if because of copy protection or some other feature, a disk places unusual stress on my disk drive, and the manufacturer fails to clearly advise me of this prior to my purchase, then I believe that manufacturer is abusing and exploiting me. Isn't truth in packaging a *sine qua non* of doing business with integrity in a highly technical area?

Second, if the copy protection a manufacturer employs on productiv-

ity software I use in my work will require me to purchase a duplicate or apply to the manufacturer for a replacement should the software fail, and the manufacturer fails to advise me of this prior to purchase, then I believe the manufacturer is jeopardizing my pursuit of my livelihood.

Third, aren't copy protection schemes evidence that manufacturers are reluctant to respect the fundamental rights of their customers? If the law is weak, as Mark L. Goldberg of Timeworks suggests, why not work to get the law changed rather than dumping on me and thee?

Max Roesler
St. Cloud, MN

Money Speaks!

It's frustrating to spend $30 or more on a program that states "for Commodore 64/128" on its box, then get it home and spend the next two hours in a futile attempt to boot it. Maybe Commodore users should organize and follow the lead of many large corporations and even the U.S. government in demanding unprotected software. I remember reading last year that the makers of Lotus 1-2-3 lost out on a rather large government contract because Lotus is protected.

Michael D. Moffit
Flint, MI

South of the Border

I live in the central highlands of Mexico, where personal computing is practically unknown. The excessive duties and slowness of package delivery by the Mexican post office make replacing a blown disk both expensive and time-consuming, so it's important that I have backups. I copy all my disks.

One solution to the copy problem would be for each manufacturer to furnish a backup disk along with the original. The cost of making a disk is miniscule—it's the research, advertising and overhead that makes the original disk expensive. Another solution would be for the manufacturer to make backup disks available for the cost of shipping and handling, plus the cost of producing the disk. Of course, the ideal solution would be to eliminate protection, but that wouldn't cut down on illegal copies.

I might add that I consider "head rattling" unethical. To wreck the user's disk drive to protect a program is a low blow. If at all possible, I avoid buying such software and suggest that the manufacturers be boycotted by the public until they drop these protection schemes.

Robert W. Bruggemeyer
Jerez de Garcia Salinas
Zacatecas, Mexico ■

A Call to Readers

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

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FEATURES INCLUDE: works in seconds, eliminates protection, menu driven, works on 1541 and the 1571, copies made are fully compatible with 3rd party drives, and updated every 2 months. Now available for the Atari ST $24.95.

$4.99 PARAMETERS R' US (10 pack)

The 10 pack is for those that can't wait 2 months for the next release of the next (100 pack). This package will be released every 1 to 2 weeks and will include those titles that were just released.

$9.99 PARAMETERS R' US (GEOS pack)

This Parameter disk was designed just for GEOS and all its Utility packages. Not only will it eliminate the protection, but will also allow use of GEOS UTILITIES (desk pack, writers workshop, geo dex) with any GEOS that has been FIXED with this set of parameters.

$9.99 PARAMETER KRUNCHER

Takes the protection out of Keymaster keys and Fast Hackem parameters and allows you to compile 600 keys and/or parameters on a disk.

$29.99 LOCK PIK C64/128 (The Book)

Lock Pk 64/128 was put together by Utilities Unltd. as a tool for those who have a desire to find out how the heavy Hackers do it. This package includes:

1. Lock Pik book that gives you step by step instructions on BREAKING or backing up over 100 popular programs using Hesmon and Superedit. The instructions are so clear and precise that anyone can use it.

2. Lock Pick disk has Hesmon 64, Superedit, Disk Compare, Kernal Save, I/O Save, and Disk File log with detailed instructions on how to use these programs all on 1 disk.

3. We also have a limited supply of Hesmon cartridges that will be given out free while supply lasts.

I think you will agree this is the best buy to come along in a long time, you get it all for $29.99.

Circle 187 on Reader Service card.

Compiled by HAROLD R. BJORNSEN

Bring Home America's Cup

Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404) has released the disk-based Official America's Cup Sailing Simulation for the C-64. In this one- or two-player game you are on the Perth course, where you use a joystick to select, raise and lower sails, navigate your ship and overlook the entire course to complete a three-dimensional, eight-leg race that covers over 24 nautical miles. Available for $24.95.

Check Reader Service number 400.

Convert Your Graphics

Cardinal Software (14840 Build America Drive, Woodbridge, VA 22191) introduces the Graphics Converter, a graphics program for the C-64 and 1541 and 1571 disk drives. It converts your Print Shop graphics so that you can use them with the Print Master program and vice versa. Features include a help screen, directory listing and two automatic conversion modes. It's available on disk for $19.95.

Check Reader Service number 401.

Give Recognition

Springboard (7808 Creekridge Circle, Minneapolis, MN 55435) has released Certificate Library Volume 1, a companion program for its Certificate Maker package. The library provides more than 100 new predesigned certificates and awards for a wide range of occasions, and features 24 new borders to frame certificates and six dozen new seals and stickers. You can get it on disk for the C-64 for $34.95.

Check Reader Service number 404.

Give Lessons

The Lesson Master Courseware Authoring System for the C-64 and C-128 allows novices and experienced users to develop computer-assisted instruction lessons without the knowledge of a programming language. It's network-compatible and will track a student's progress throughout the course. Features include a built-in character-shape editor, sprite-shape editor, sprite animator and a sound and music editor. Available on disk for $59.95. Small Systems Software, 150 Chapman Drive, Wellsburg, WV 26070.

Check Reader Service number 405.

Hog and Crop Info

Computer Friend (RR #1, Box 143, Camp Point, IL 62320) releases two farm record-keeping programs on disks for the C-64 and C-128 for $95 each.

Hog Info keeps track of the cost of grind-mix rations and supplies an accurate feed inventory of ingredients as they are used. Other features include profit-loss figures, hogs' average daily weight gains and days to market.

Crop Info features crop comparisons and sales, grain inventory and value, break-even cost of production, fixed and variable costs and averages.

Check Reader Service number 403.

Touch and Go

Computer Easy (414 East Southern Road, Tempe, AZ 85282) has released two software packages on disks for the C-64 at $9.95 each.

Touch-Typing Tutor, a typing-skills tutorial, gives you practice in correct fingering and develops your speed and accuracy for effortless typing.

In Crazy Conveyors, an arcade-style chase game, a built-in screen creator lets you modify the 64 screens on the disk or add your own to make the chase crazier and more exciting.

Check Reader Service number 415.

Create Football Teams

If the plethora of televised football games isn't enough for you fans, then take a look at GFL Championship Football, a disk-based football simulation program for the C-64. Scrolling screens give you the feeling of moving up and down the field as you engage in any of 34 offensive plays, 12 defensive alignments, kick-offs, field goals and punts. You can select your team's playing style, then play against any of 27 separate computer-controlled GFL opponents or compete against a friend. Available from Activision (2350 Bayshore Parkway, Mountain View, CA 94043) for $34.95.

Check Reader Service number 408.

Make Beautiful Music

Sonus (21430 Strathern, Suite H, Canoga Park, CA 91304) introduces the FB01 Design, a full-featured, double-banked MIDI librarian and editor

for the C-64 and the FB01 module from Yamaha. The FB01 Design lets you receive and send full banks of voices and configurations, which can be rearranged, edited, saved to and loaded from disk. It features two independent banks for voices and configurations, full library functions and a print-screen feature. The FB01 Design works with Sonus-, Passport- and Sequential-compatible interfaces. $129.95.

Check Reader Service number 409.

Wipe Out Terrorism in Space

Absolute Entertainment (PO Box 287, Midland Park, NJ 07432) releases X-15 Alpha Mission, an arcade-style flight mission game with 3-D graphics for the C-64. As pilot of NASA's legendary X-15, which is equipped with an assortment of weaponry, a lunar excursion module and a fleet of remote-controlled robots, your mission is to penetrate hostile aircraft to destroy a terrorist-controlled space station. X-15 Alpha Mission is available on disk for $29.95.

Check Reader Service number 406.

Trek to the Stars

As James T. Kirk, Captain of the Starship *Enterprise*, you will engage in one of the most challenging battles of your career. You'll make contact with an alien culture and search their planet for a food supply for your starving crew. To embark on this journey, you need Star Trek: The Promethean Prophecy, a text-adventure game from Simon & Schuster Software (Gulf + Western Plaza, New York, NY 10023). It's available on disk for the C-64 for $32.95.

Check Reader Service number 407.

Spartan News

Mimic Systems (c/o EDP Industries, 205-1401 West 8th Ave., Vancouver, B.C., Canada V6H 1C9) has repackaged its Spartan Apple II emulator for the C-64 to replace the DOS card with an Apple-compatible disk drive. The decision was prompted by requests from Spartan buyers and by the amount of technical assistance required for the installation of the DOS card in the 1541 disk drive. The Spartan plus the Apple-compatible disk drive cost $329.95.

Solve a Mystery in London

As a tourist exploring the British capital in Ticket to London, a software travelogue for the C-64, you discover that you've lost your return ticket. To get it back, you must follow a jolly bowler hat around the city, answer challenging questions and solve a mysterious puzzle. The program's database gives you new material each time you play. Ticket to London is available on disk for $29.95. Blue Lion Software, PO Box 650, Belmont, MA 02178.

Ticket to London, from Blue Lion Software.

Check Reader Service number 402.

Write Better Programs

Schnedler Systems (1501 N. Ivanhoe, Arlington, VA 22205) has released its Symbol Master disassembler for the C-64 and C-128, and Pterodactyl Software PTD-6510 Version 4.0, a machine language programmer's utility for the C-64. Each package costs $49.95.

With Symbol Master, for beginning and experienced 6502 assembly language programmers, you improve your programming skills by studying programs written by others, and existing programs can be readily adapted to your own needs.

The PTD-6510 ML utility tests and debugs assembly language programs you have written. It disassembles and single-steps through your code, and windows let you observe your program variables while stepping. The package also includes a manual, which has been substantially rewritten.

Check Reader Service number 418.

Break the NHRA Records

Drag Race Eliminator, a simulation of professional drag racing for the C-64, has five classes of NHRA competition in three modes of game play to permit one player practice or time trials, two-player competition or one player versus the computer. You compete in a 20-round match or try to break the actual NHRA record for each class. Drag Race Eliminator is available on disk for $24.95 from Family Software, 3164 Surrey Lane, Aston, PA 19014.

Check Reader Service number 416.

Play with Words

Wordmaze, a disk-based word-search puzzle for the C-64, helps students in grades 3 and up improve their spelling, build word power and sharpen visual skills as they search for words hidden in a block of scrambled letters. Teachers may enter a list of up to 40 ten-letter words, and the program stores up to 133 word lists. The package includes a teacher's guide with activity sheets. Wordmaze is available for $49.95 from Learning Well, 200 South Service Road, Roslyn Heights, NY 11577.

Check Reader Service number 420.

Keep Track of Your Business's Cash

Microsphere (Plymouth Center, 521 Plymouth St., Greensburg, PA 15601) has released Cash In/Cash Out, a cash-basis accounting package for small- to medium-size businesses. The system records sales and expenses when checks are written for expenses or received for sales rather than when sales are ordered or expenses are incurred. Some features of the system include a sales module that tracks up to nine categories, a disbursement module that handles up to 200 expense accounts and a payroll module that includes federal tax tables and handles up to 75 employees. Cash In/Cash Out is available on disk for the C-128 for $69.95.

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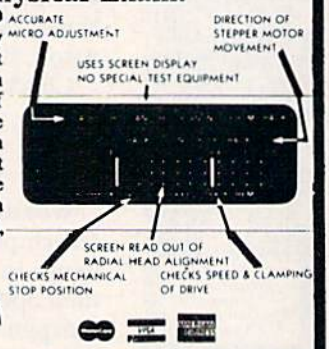
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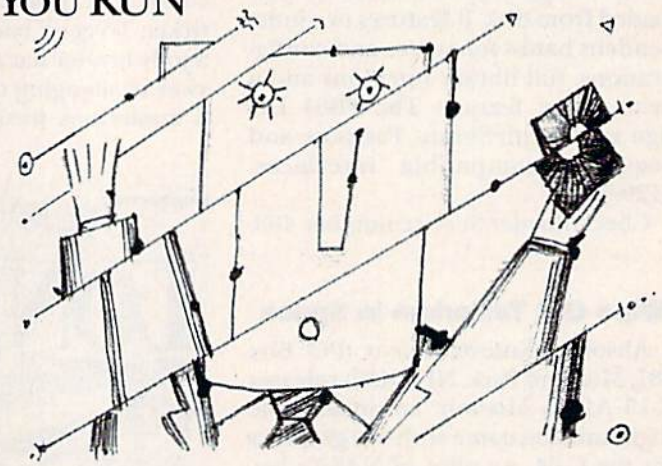

We receive many letters from new Commodore owners who want to learn the first steps in using their computers. For these first-time users, we present the following step-by-step list of things that all beginners should be aware of as they start typing in programs.

1. Before you can use a fresh disk, you have to format it. First turn on your disk drive, then insert the disk, close the latch and type:

```
OPEN15,8,15 <Press Return>
PRINT#15,"N0:NAME,##" <Press Return>
```

The ## is a two-character identification number that can be any combination of letters and/or digits. "NAME" can be any title for your disk that you choose, but it must not exceed 16 characters. Wait for a few minutes while the disk spins inside the drive, being formatted. When the disk stops spinning, type:

```
CLOSE15 <Press Return>
```

C-128 owners can shorten this procedure by simply typing:

```
HEADER "NAME,##" <Press Return>
```

Caution: The formatting process erases all material already on the disk, so if you're formatting a used disk, make sure it doesn't contain any programs you want to save. See item 7, below, on reading the disk directory.

2. As a beginner, you should start entering short Basic programs. Avoid machine language listings and very lengthy Basic programs until you get the hang of what you're doing. We have a checksum program (Perfect Typist) which actually proofreads your typing and tells you when you make a mistake. You should type in Perfect Typist before you enter any programs. See directions below.

3. Remember to press the return key after each programming line you type in.

4. As you are typing in a program, you are likely to make typographical errors. To check what you have typed in, you'll need to list your program's lines on the screen. You can specify the exact lines that you want to see. Typing LIST 10–50 will list lines 10 through 50. LIST 20 will list only line 20. If you see an error in one of your

listed lines, you can fix it by using the INST/DEL key and retyping the incorrect section of the line. Always press the return key after you have fixed a line.

5. Be sure to save what you have typed in before turning off your computer. To save any partial or complete Basic program listing to your disk, type:

SAVE "NAME",8 <Press Return>

C-128 owners can press F5, type in the program name, and press the return key.

Note: As you save subsequent versions of the same program, you need to make a slight change in the program name each time. You might simply add version numbers to the end of the program name (PROGRAM.1, PROGRAM.2, etc.).

6. While working on a program, you may develop several versions before you're satisfied that you have it in final form. After you *do* achieve that final version, you might want to go back and erase the old, incomplete versions from your disk. Erasing unwanted programs is called scratching. (Be sure not to erase your final version!) To scratch a program, type:

OPEN15,8,15 <Press Return>
PRINT#15,"S0:prog.name" <Press Return and wait a few seconds>
CLOSE15 <Press Return>

7. After you have saved several programs to your disk, you will need to see their names so that you can load the one you want. To get the complete list (the disk directory) of all the program names on your disk, type:

LOAD "$",8 <Press Return>

Then type LIST to actually see the directory. C-128 owners simply press F3.

8. When you know what program you want to load into your computer, type:

LOAD "NAME",8 <Press Return>

C-128 owners can just press F2, type in the program name, and press the return key.

9. After you have loaded a program, type RUN to actually use the program.

How to Type Listings From *RUN*

To simplify your typing of *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., :REM*123). These checksum numbers necessitate your using *RUN*'s Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are

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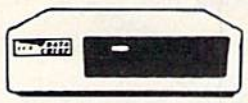

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the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN* as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incompleted program that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
1Ø POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
2Ø PG=PEEK(56):ML=PG*256+6Ø
3Ø FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
4Ø IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
6Ø POKEML+4,PG:POKE ML+1Ø,PG:POKE ML+16,PG
7Ø POKE ML+2Ø,PG:POKE ML+32,PG:POKE ML+38,P
   G
8Ø POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   **********************"
9Ø SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
```

Listing 1 continued.

```
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+30"=OFF **"
101 PRINT"{CRSR RT}**********************
    **************":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

Listing 2. *128 Perfect Typist program.*

```
1 REM 40/80 COL C128 PERFECT TYPIST
2 REM BY: JAMES E BORDEN
10 FORX=5120TO5379:READD:T=T+D:POKEX,D
20 NEXT:IFT<>28312 THENPRINT"{2 CRSR DNs}ER
   ROR IN DATA...":END
25 A$="":IFPEEK(215) THENA$="{20 SPACEs}"
30 PRINT"{SHFT CLR}"A$" ******************
   ******************"
40 PRINTA$" ** 128 PERFECT TYPIST IS NOW AC
   TIVE **"
50 PRINTA$" **{2 SPACEs}SYS 5120=ON{7 SPACE
   s}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$" ******************************
   *******":SYS5120:NEW
70 DATA 173,5,3,201,20,208,1,96,141,45,20,1
   73,4,3,141,44,20,162,43,160,20
80 DATA 142,4,3,140,5,3,96,234,234,173,44,2
   0,141,4,3,173,45,20,141,5,3,96
90 DATA 32,13,67,140,255,19,162,0,142,252,1
   9,142,253,19,142,254,19,189,0,2
100 DATA 201,32,240,8,201,48,144,7,201,58,1
   76,3,232,208,238,189,0,2,240,54
110 DATA 201,32,208,5,172,254,19,240,42,201
   ,34,208,10,72,173,254,19,73,1
120 DATA 141,254,19,104,72,238,253,19,173,2
   53,19,41,7,168,104,24,72,24,104
130 DATA 16,1,56,42,136,16,246,109,252,19,1
   41,252,19,232,208,197,173,252
140 DATA 19,24,101,22,24,101,23,141,252,19,
   169,42,32,241,20,32,188,20,160
150 DATA 2,185,185,20,32,241,20,136,16,247,
   165,116,208,9,165,117,208,5,169
160 DATA 145,32,241,20,172,255,19,96,13,32,
   32,162,0,173,252,19,232,56,233
170 DATA 100,176,250,105,100,202,240,3,32,2
   32,20,201,10,176,5,205,252,19
180 DATA 240,15,162,0,232,56,233,10,16,250,
   24,105,10,202,32,232,20,170,72
190 DATA 138,9,48,32,241,20,104,96,170,173,
   0,255,72,169,0,141,0,255,138,32
200 DATA 210,255,104,141,0,255,96 ■
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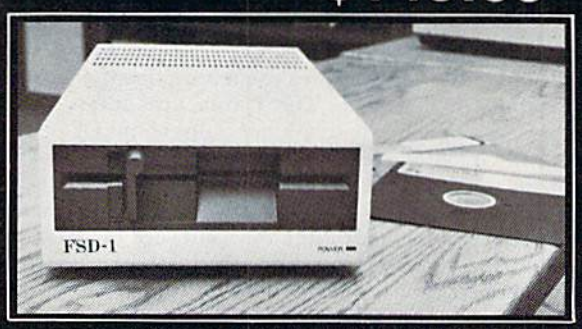

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ON-LINE HAPPENINGS

COMMODORE SIG ON THE SOURCE

The Source Information Network has introduced a special interest group for the C-64, C-128 and Amiga. Called ICUG-SIG, for Independent Computer Users Group SIG, this service offers software, bulletin boards, computer conferences, answers to computing questions, alerts to hardware bargains and industry information. Subgroups within this SIG, which is one of the largest on The Source, include Inner Works, Entertainment and Amiga.

DELPHI COMMODORE SIG

Flagship Commodore is Delphi's special interest group for users of Commodore computers. Members share information and generally help each other get maximum performance from their machines. Delphi offers 19 other SIGs as well, including Starship Amiga, a business forum, games and science fiction SIGs, artists' and model-builders' networks and a music and entertainment forum.

QUANTUMLINK NEWS

QuantumLink's on-line Learning Center has inaugurated on-line classes with offerings ranging from English for grades 3–8 to Computer Mathematics for advanced programming students. The class sessions, which include lectures and question-and-answer sessions, are posted throughout the Learning Center, the monthly Q-Link newsletter and in each day's Best Bets section. Between sessions, students correspond with teachers via message boards and download and upload materials for studying off-line.

Q-Link has also recently compiled its on-line Public Domain Software Library into a fully alphabetized hard-copy directory containing titles of 5000 free programs. Available for $9.95, the directory enables Q-Link members to browse through the software listing before going on-line.

News Talk, the latest addition to Q-Link's Auditorium, is a weekly talk show enabling Q-Link members to discuss current events with experts on-line. Recent News Talk topics have ranged from AIDS to Middle East problems.

QuantumLink and GEOS-creator Berkeley Softworks have recently added several features to their on-line user-support service, the GEOS Forum. The Forum now offers Q-Link members an opportunity to ask questions about GEOS, participate in GEOS conferences with Berkeley staff members, download updated GEOS programs and read the latest on GEOS products, program updates and technical information. The Forum also includes three new software libraries, and it has added a geoLaser document-printing service, through which members can upload geoWrite documents to be laser-printed for them by Berkeley.

A new form of on-line currency, Q-Pons, is being distributed to Q-Link members for their help to the on-line service. Members earn the Q-Pons by registering a friend on-line, using Plus and off-peak hours, renewing a Q-Link membership and more. Then they trade them in for free or discounted merchandise from the service's on-line store.

The Mall, Q-Link's on-line shopping center, has welcomed a number of new merchants. They include Express Music, with bargain prices on records, albums and compact disks; Long-Distance Roses, which delivers flowers anywhere in the U.S.; and The New Software Finder, purveyors of a wide variety of Commodore software.

For more information, contact: **The Source**, 1616 Anderson Road, McLean, VA 22102; 800-336-3366; **Delphi**, 3 Blackstone St., Cambridge, MA 02139; 800-544-4005 or 617-491-3393; **QuantumLink**, 8620 Westwood Center Drive, Vienna, VA 22180; 703-448-8700.■

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If you have any questions about *RUN*'s Class Ad section, call **Heather Paquette at 800-441-4403 or 603-924-9471** or Brenda Billheimer in California at 415-328-3470. We accept checks, money orders, Master Card or VISA.

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May

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● **COMMODORE EXEC SPEAKS OUT**—*RUN*'s editor-in-chief met recently with Nigel Shepherd, head of Commodore's North American operations. In the May issue, we will report on Shepherd's candid comments about Commodore's financial situation, the company's commitment to the 64/128 product line, its relationship with third-party software developers and its plans for the educational market and new products.

● **DESKTOP PUBLISHING**—Last month in Coming Attractions, we promised an update article on Commodore desktop publishing. Unfortunately, it wasn't in the stars for this issue. We'll make good in May with a look at the latest software for combining text and graphics to produce everything from cards to newsletters.

● **C-128 WINDOWS**—We'll also present a utility for creating temporary screen windows on your C-128. These windows let you access the disk directory, list a program or enter commands—without disturbing the original display.

● **PRINTRITE 64**—This utility for Commodore dot matrix printers provides true descenders and a much-needed underline command to make your documents more readable and attractive.

● **PEGBOARD**—Here's a program that simulates the Hi-Q peg-jumping game we all know.

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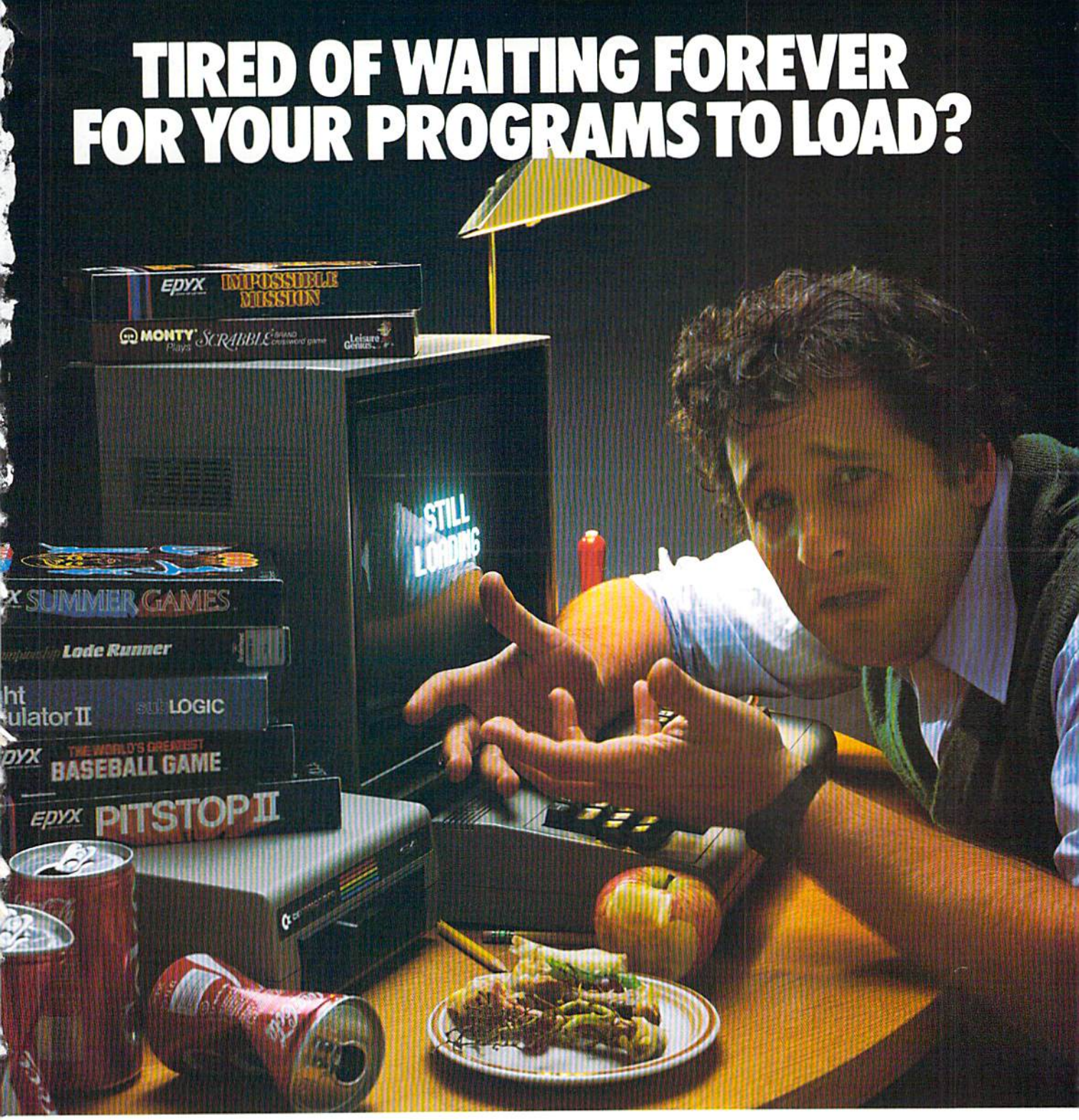

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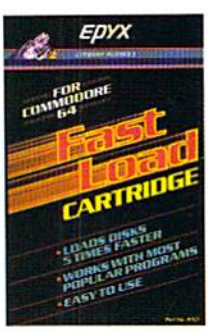

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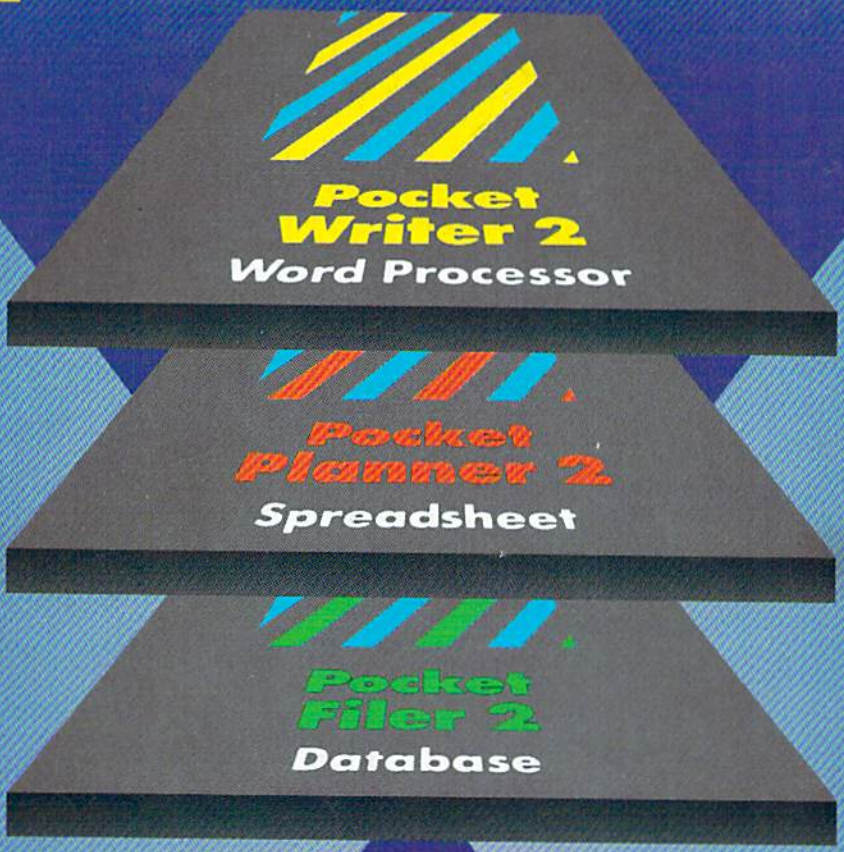

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